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LIST OF

RUSSIAN METEOROLOGICAL PAPERS

PUBLISHED FROM

1950 to 1955

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Prepared by the Academy of Science of the U.S.S.R.
for presentation to the International Association
of Meteorology at the XI General Assembly of the
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FOREWORD

The Eleventh General Assembly of the International Union of Geodesy and Geophysics was held in Toronto, September 3-14, 1957. Approximately 1500 individuals from 60 countries took part in its sessions. The International Association of Meteorology and Atmospheric Physics together with the other six member Associations ran a series of individual and joint meetings. The Union of Soviet Socialist Republics sent a large delegation to the Assembly and took an active part in the meetings. In order to inform other countries of the work the U.S.S.R. was carrying out in meteorology, a Bibliography was prepared of the U.S.S.R. publications in this field largely covering the years 1950-55. It was thought that this Bibliography would be of considerable interest to the world of meteorology and so this translation was prepared and distributed by the Meteorological Service of Canada.

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TRANSLATOR'S NOTE ON ABBREVIATIONS USED

Publications

Astron/omy, etc.
Bull/etin
Geog/raphy, etc.
Hydr/ology, etc.
Hydromet/eorology, etc.
Inst/itute
J/ournal
Math/ematics, etc.
Mech/anics, etc.
Met/eorology, etc.
Obs/ervatory
Pap/er, etc.
Prob/lem, etc.
Publ/ishing
Re/search
Sci/ence, etc.
Soc/iety
Univ/ersity
Vol/ume

Soviet Institutions (Translated or transliterated)

Acad. Sci	for	Academy of Science
CAO	for	Central Aerological Observatory
CA Hydromet S	for	Chief Administration of the Hydrometeorological Service
CFI	for	Central Forecasting Institute
GITTL	for	State Publishing House of Technical and Theoretical Literature
MGO	for	Main Geophysical Observatory (VOIEKOV'S Observatory)
SSR	for	Soviet Socialist Republic
USSR	for	Union of Soviet Socialist Republics
VGMF SA	for	Military Hydrometeorological Faculty of the Soviet Army
VGMO	for	Military Hydrometeorological Observatory
VGO	for	Military Hydrological Observatory

The meanings of the following transliterated Russian abbreviations for their institutions occurring in the translation are unknown:

KOLL, LIOT, OGMI, SHETF, UFN.

Transliteration of Russian authors' names has been made in conformity with the method adopted by the Congressional Library of the USA, and the RUSSIAN geographical names according to the method adopted by the Board of Geographical Names, Department of the Interior, USA.

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RUSSIAN METEOROLOGICAL PAPERS
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1950 to 1955

Academy of the Science of the USSR

Committee of Geodesy and Geophysics

Information on Scientific Research in Meteorology

To be presented

to the International Association of Meteorology at the XI

General Assembly of the International Union of

Geodesy and Geophysics

A publication of the Academy of Science of the USSR

INTRODUCTION

The present report reflects the scientific research activities of the USSR from 1950 - 1955 in the following fields of meteorology: climatology, synoptic meteorology, dynamic meteorology, actinometry, atmospheric optics, physics of cloud and precipitations, physics of the surface layer of air and atmospheric turbulence.

Together with the following literature references it is expedient to present a short list of textbooks, reference books and exhaustive monographs on special problems published during the above mentioned period. In the latter category belong:

1. "Text book of Meteorology" (physics of the atmosphere), edited by P.H. Tverskoi (1951, 878 pages), an educational accessory for hydrometeorological institutes and universities. (Available in our library. Translator.)

2. "Basic Principles of Dynamic Meteorology", edited by D.L. Laikhtman and M.I. Judin (1955, 647 pages), an educational accessory for students and research workers.

3. "Meteorological Instruments." V.H. Kedrolivanskii and M.S. Sternzata (3rd edition, 1950, 540 pages). This contains the description and theory of contemporary meteorological instruments as well as instruments of radiation, atmospheric optics and atmospheric electricity, etc, etc.

4. "Physics of the Atmosphere" by A. KH. KHRGIAN (1953, 456 pages), a textbook for universities and hydrometeorological institutes, containing a comparatively detailed physical and mathematical analysis of some meteorological problems.

5. "Basic Principles of Aviation Meteorology" by L.T. MATVEEV and P.I. SMIRNOV (1955, 335 pages) - contains in a compact form contemporary principles of general and synoptic meteorology and demonstrates their practical application, particularly in weather forecasting.

6. "Textbook of Climatology." B.P. ALISOVA, O.A. DROZDOV, and E.S. RUBINSHTEIN (part I, general climatology and climatological methods of data processing, 1952, 487 pages); part III, the climate of the world, 1954, 320 pages, a recommended text and reference book for higher educational institutions and for specialists in the field of climatology. (Parts I and II available in our library. Translator).

7. "Climatology" by S.I. KOSTIN and T.V. POKROVSKII, (1953, 425 pages) a textbook for agricultural institutes and agricultural specialists. Considerable space is devoted to the discussion of climatological methods.

8. "Manual of Shortrange Forecasting", a publication of the Central Forecasting Institute (part I and II, 1954-1955) summing up in compact and practical convenient form the contemporary methods of synoptic forecasting, illustrating the latter with many examples and themes.

9. "Dynamic Meteorology", by K.T. LOGINOV (1952, 150 pages), a compact and comparatively elementary account of the basic principles of contemporary dynamic meteorology.

Among the published monographs on meteorological problems should be mentioned:

1. "Radiant heat of the Sun", by K.IA. KONDRATEV (1954, 600 pages) together with his recent book "Radiant exchange of heat in the atmosphere" (1956, 420 pages). This appears to be the most extensive review in the world on radiation processes in the atmosphere, reflecting the present state of affairs in this branch of science in the Soviet Union as well as abroad.

2. "Atmospheric Ozone", by I.A. PROKOFEI (1951, 231 pages), a compact but nevertheless exhaustive account of results of scientific research in the field of atmospheric ozone.

3. "Clouds, precipitation and the thunderstorm electricity" by N.S. SHISHKIN (1954, 280 pages) is devoted mainly to the study of physical processes in clouds and to their mathematical treatment, also covering the formation of precipitation (particularly in convective clouds).

4. "Ice in the Atmosphere" by A.D. ZAMORSKII (1955, 377 pages), is a complete description of different forms of solid precipitation, their growth and decay, statistics, conditions of observation and process of settling down to the earth surface.

I CLIMATOLOGY

General problems, educational accessories and courses

In 1951-1954 a number of papers were published on the contemporary state of climatology and on trends in its future progress (1 - 35).

An exhaustive discussion of the above problems took place at the meeting on climatology organized by the Chief Administration of the Hydromet. Service in June, 1953. The proceedings of that meeting were published in 1954 in the collected volume "On the contemporary state and future trends of climatology" under the editorship of M.I. BUDYKO.

Radiational factors of the climate

In recent years many papers have been published on the problem of radiation factors of the climate. Most of them deal with the study of radiation and heat balances.

In the papers of the research staff of the Main Geophysical Observatory (MGO) were developed, for the first time, the maps of the components of the radiation and heat balance over a number of territories (41-50, 52, 57, 58, 60).

This project was completed with the publication of the "Atlas of the Heat Balance" (40), containing 66 maps for the annual and monthly mean components of radiation and heat balance over the whole world.

Many papers deal with the study of radiation and heat balance over individual regions by specially organized observations. Most outstanding among the latter are the studies by research workers of the Geophysical Observatory of the University of Tashkent (36-39, 51, 53-56, 59, 61-63). Particularly, the variation of heat balance over different kinds of the ground surface and the effect of artificial irrigation has been the object of a detailed study.

Circulation factors of the climate: circulation of moisture

In recent years the circulation components of the climate have been studied throughout the northern hemisphere (64, 65, 73, 74, 80, 83, 85, 89, 100-104, 107-111, 113, 114, 120, 122) as well as on the scale of individual regions or individual phenomena (66-69, 75, 76, 88, 92, 96-99, 105, 119, 121).

The first group of works deals with the study of synoptic macroprocesses over large areas of the earth's surface and their relationship with the circulation indices and their role in the variation of climates. The second group comprises the studies of factors determining the general characteristics of the climate of different regions of the USSR and also development of various processes and phenomena (for example dry winds) or weather and climatic conditions (for instance precipitation in the south-east of the European USSR).

Much attention has been paid to the research on the circulation of moisture in the atmosphere, particularly from the viewpoint of the possibility of diverting it in connection with measures foreseen in the plans of modification of climate (70, 72, 77-79, 86, 87, 90, 91, 93-95, 103, 106, 112, 115-118, 123-126, 128).

A large symposium was held on this topic at the Institute of the Geography of the Academy of Science of the USSR. The proceedings of that meeting have been published in (81).

Theory of Climate: Changes and variations of the climate

In works on the theory of climate (134, 142, 149, 150, 155) research was extended to the theory of the general circulation. Proceeding from basic principles of hydrodynamics a theoretical explanation was derived for the distribution of temperature, pressure, wind etc. etc., in the earth's atmosphere. Simultaneously it succeeded in evaluating the effect of the different types of working surface, albedo, evaporation, condensation, etc. etc.

Many studies have been devoted to the problem of climatic change during historical and pre-historic times. In works (129-133, 135-141, 143-148, 151-154) evidence is presented for short-range fluctuations and long-range changes in the thermal and moisture regimes over different territories. Particularly detailed study has been made on the general warming trend of the climate during the last ten years and on the problem of the beginning of a new period in the change of climate. In some of the above-mentioned studies use has been made of data on the variation of solar activity (157-159).

Climatic factors of natural processes

Most of the work devoted to the study of climatic factors by natural processes investigates the relationship between climatic conditions and the components of hydrological processes: evaporation, runoff, intensity of snowmelt, etc. (161-164, 166, 167, 169-181).

The dependence of the zonal distribution of soil on the climate is studied in the monograph (165), published in 1953.

The relationship between the climatic conditions and the main geographical zones is discussed in (160) and (168).

The amelioration of climate: Studies on local climates

In recent years a substantial number of our climatologists have participated in the study of hydrometeorological effectiveness of amelioration projects.

A great number of studies have been devoted to research on effects of artificial irrigation on the climate of the surface layer of the air. The effect of artificial irrigation on radiation balance, different stages of heat balance in different conditions of plant cover, soil temperature, conditions in the surface layer of air, nightfrosts, the length of vegetation period, etc., have been discussed in (182, 183, 188-191, 194, 196, 197, 200-203, 205, 208, 211-214, 217-219, 224-230, 235, 238, 239, 241-244, 249, 251-258, 265-268, 271, 272, 274, 275, 277, 285, 288, 289, 293, 294, 298-300, 302-304, 307-309). The effect of field-protecting forest belts on the meteorological regime, on turbulence and circulation of the air, and in particular, on the heat balance, snow cover and temperature of the soil, and length of the vegetation period have been the subjects of papers (184, 185, 187, 192, 193, 195, 198, 199, 204, 240, 245, 246, 248, 250, 259-264, 269, 270, 273, 276, 279-281, 283, 284, 286, 290-292, 295, 296, 301, 305, 306).

A number of papers deal with the change of climatic conditions resulting from drainage of marsh lands (186, 210, 221, 227,278, 282).

Since the methods of the latter studies are closely related to the methods of the study of the peculiarities of the local climate in different geographical regions there are a considerable number of works dealing with the study of local climate in regions of amelioration projects.

Agroclimatology: Phenology

Scientific works in this field, regardless of their research problems, have a clearly defined practical goal: to improve the conditions for plant growth and to increase agricultural yields.

The subject of these studies has been the relationship between hydrometeorological and climatological conditions and the individual agricultural crops and their yields, the effect of unfavourable weather on the growth of crops and the deviations from the general rules covering the interaction between the climate and agricultural plants. The influence of agriculturally exploited irrigated soils on the climate of large regions, for example, in Mid-Asia, have been studied in (311-376).

In particular, attention should be drawn to the studies dealing with the artificial irrigation hitherto unused soils in the eastern part of the USSR.

A great effort has been directed to the evaluation of agroclimatological and hydrological resources of regions of virgin and unused soils earmarked for agricultural exploitation by artificial irrigation.

Climatography

Climatographical works of the USSR have encompassed many parts of the globe, including the Antarctic. Particularly exhaustive have been these studies in the different regions of the USSR. Many climatic reference books have been published, containing the results of digested observational material. The climate of various parts of the USSR has been the subject of corresponding monographs and articles. The conditions for formation of individual climates and weather phenomena have also been studied (377-425).

Methods of working up and generalization of observational data

Of great importance among these studies have been the problems related to heat balance and to its individual components, in particular, to the climatological computation of heat balance.

The methods of climatographical preparation of observational data are exhibited in works which deal with complex climatology and the mechanical processing of data (426-449).

LITERATURE

1. ALEKSANDRIAN, G.A. Some remarks on the problems of climatology. Met. & Hydr. 1952, #12.

2. ALISOV, B.P. On climate and climatology. Met. & Hydr. 1952, #12.

3. ALISOV, B.P. On the scientific objectives of Soviet climatology and their practical implications, Prob. of Geog. Vol. 28, 1952.

4. ARKHANGELSKII, A.M. On some problems of the evolution of climate. J. All-Union Geog. Soc. Vol. 85, #4, 1953.

5. ARKHANGELSKII, V.L. On trends in the Fatherland climatology, Met. & Hydr. #5, 1953.

6. BABENKOV, E.F. On the theory of climate. Met. & Hydr. #10, 1951.

7. BAGROV, N.A. On some problems of climatology. Met. & Hydr. 1952, #7.

8. BALABUEV, A.G. Experimental basis of the method of climaticgenetic analysis. Pap. Inst. Geophys. Acad. Sci. of Gruzian SSR, Vol. 18, 1953.

9. BORISOV, A.A. Determination of the concept of "Climate" in connection with the progress of climatology in the USSR. J. All-Union Geog. Soc., Vol. 84, #4, 1952.

10. DAVITAIA, F.F. The state and trends of development of Soviet climatology. Met. & Hydr. 1953, #9.

11. DROZDOV, O.A. On the state and trends of development in climatology. Met. & Hydr. 1952, #12, 1953, #1.

12. DUBINSKII, G.P. Meteorology and Climatology in the University of Kharkov. Sci. pap. Univ. Kharkov, Vol. 56, 1956.

13. EZHOV, A.A. On climatology. Met. & Hydr. 1953, #5.

14. KOSTIN, S.I. Some remarks on the development of climatology. Met. & Hydr. 1953 #5.

15. KOSTIN, S.I. Meteorology and Climatology (textbook for forestry economists and forestry institutes), second edition, Hydromet. Publ. House, 1951.

16. KOSTIN, S.I. Meteorology and Hydrology, 3rd corrected and supplemented edition, Hydromet. Publ. House, 1955.

17. KUVSHINOV, K.V. All-Union meeting on climatology. Geog. J. Acad. Sci. USSR., 1953, #6.

18. LEBEDEV, A.N. On climatology (a suggestion for discussion) Met. & Hydr. 1952, #2.

19. MAKSIMOV, S.A.	I.P. PROLINOV as the founder of agricultural meteorology (On the centenary of his birth). Second corrected and supplemented edition. Edited by A.I. RUDENKO, Hydromet. Publ. House, 1952.
20. MARKOV, K.K.	A.I. VOEIKOV as the historian of the climates of the earth. Geog. J. Acad. Sci. USSR., 1951, #3.
21. MARKOV, K.K.	On the problems of historical climatology. (Paleoclimatology). Geog. J. Acad. Sci. USSR., 1951, #4.
22. NOVIKOV, A.G.	Climatology and the demands of industry. Met. & Hydr., 1953, #5.
23.	On the present state of climatological research and its future trends of development. (Papers and discussions of the meeting of climatology at the Chief Administration of the Hydromet. Service, June 22-25, 1953). Editor: M.I. BUDYKO, Hydromet. Publ. House, 1954 (Bull. of the Chief Adm. of the Hydromet. Service #3-4).
24. POGOSIAN, KH. P.	On the contemporary state of climatology. J. All-Union Geog. Soc. Vol. 84, #5, 1952.
25. POGOSIAN, KH. P.	On the contemporary state of climatology and the trends in its development (a suggestion for discussion). Met. & Hydr., 1952, #1.
26. RAMENSKII, L.G.	TSATSENKIN, P.A., RABOTNOV, T.A. On the problems of the agricultural climatology. J. All-Union Geog. Soc., Vol. 84, #5, 1952.
27. RUBINSHTEIN, E.S.	On trends in the development of climatology. Met. & Hydr. 1952, #11, 1953, #1.
28. RUDENKO, A.I.	Present state, importance and tasks of Soviet Phenology. J. All-Union Geog. Soc. Vol. 83, #2, 1951.
29. SAPOZHNIKOV, S.A.	On climatology and its practical application. Met. & Hydr. 1952, #1.
30. SELJANOV, G.T.	On the climatological study of the USSR (a discussion of the contemporary state of climatology). J. All-Union Geog. Soc. Vol. 84, #1, 1952.
31. TRONOV, M.V.	Problems of climatology. J. All-Union Geog. Soc. Vol. 85, #3, 1953.
32. CHROMOV, S.P.	Climate, macroclimate, local climate, and microclimate. J. All-Union Geog. Soc. Vol. 84, #3, 1952.
33. CHROMOV, S.P.	On the causes and factors of climate. J. All-Union Geog. Soc. Vol. 83, #6, 1951.
34. CHROMOV, S.P.	On the contemporary state of climate. J. All-Union Geog. Soc. Vol. 83, #2, 1951.

35. CHROMOV, S.P. On the state and tasks of Soviet climatology. Geog. J. Acad. Sci. USSR., #3, 1952.

36. AIZENSHTAT, B.A. On the heat balance of the earth's surface at Tashkent. Geog. and Geophys. J. Acad Sci. USSR., 1951, #1.

37. AIZENSHTAT, B.A. Comparison of Compensation and gradient methods for the determination of turbulent flow of heat and general characteristics of the heat balance in semidesert. Pap. MGO., #39 (101), 1953.

38. AIZENSHTAT, B.A. and AGESHINA, E.I. Some results of study of heat balance of the ground at Tashkent. Pap. Geophys. Obs. of Tashkent. #5 (6), 1951.

39. AIZENSHTAT, B.A. and ZUEV, M.V. Some features of the heat balance of sandy desert. Pap. Geophys. Obs. of Tashkent, #6 (7), 1952.

40. "Atlas of Heat Balance". Editor M.I. BUDYKO 1955 (5), 41 pages of maps (Chief Administration of the Hydrometeorological Service at the Soviet of Ministers of the USSR, MGO).

The atlas contains the following series of maps:

A - the total solar radiation - annual and monthly values for the land surface.

V - the heat losses from evaporation - annual values for the continents, monthly values for oceans.

D - the heat gains or losses by the ocean surface as a result of currents, - annual values.

E - Evaporation - annual values for continents, monthly values for oceans.

As supplementary to the maps of heat losses by evaporation, graphs are given showing the annual variation of this quantity in different climatic regions and under different continental conditions.

Authors of the maps: M.I. BUDYKO, T.G. BERLIAND and L.I. ZUBENOK. Editor M.I. BUDYKO.

41. BEZRUKOVA, A.IA. The influence of solar activity and the nature of the atmospheric circulation upon the variation of lake levels and upon droughts. Studies of the Laboratory of Lake Control of Acad. Sci. USSR., Vol. 3, 1954.

42. BERLIAND, T.G. Annual variation of advection of heat in some climatic regions of the USSR. Met. & Hydr. 1951, #7.

43. BERLIAND, T.G. Annual variation of the total radiation of the sun according to actual observations. Pap. MGO, #48 (110), 1954.

44. BERLIAND, T.G. and EFIMOVA, N.A. Monthly maps of total radiation and radiation balance for the territory of the Soviet Union. Pap. MGO, #50 (112), 1955.

45. BORISOV, A.A. Geographical distribution of the radiation balance and its components on the territory of the USSR. Sci. pap. Univ. of Leningrad, biological, geographical and geological series, 1952, #10.

46. BUGAEV, V.A., DZHORDZHIO, V.A. and DUBENTSOV, V.R. On the thermal effect of dust in dust and sand storms. Geog. J. Acad. Sci. USSR., 1952, #3.

47. BUDYKO, M.I., BERLIAND, T.G. and ZUBENOK, L.I. Heat Balance of the earth's surface. Geog. J. Acad. Sci. USSR., 1954, #3.

48. VITELS, L.A. On the problem of the relationship between precipitation and solar activity. Bull. of the Committee for the solar research, 1951, #7 (21) (at the Astronomical Inst., Acad. Sci. USSR.)

49. GAVRILOVA, M.K. Radiation balance in the Yakutks region. Pap. Univ. of Moscow, physical-mathematical and natural science series, #4, 1954, #6.

50. GAEVSKII, V.L. On the problem of the role of albedo in the formation of radiation regimes of the earth's surface. Pap. MGO., 39 (101), 1953.

51. GOISA, N.I. Absorption of solar radiation in the free atmosphere for the region of Kiev. Pap. of Hydromet. Sci. Res. Inst. of Ukraine, #3, 1955.

52. KONDRATEV, K.IA. and TER-MARKARIANTS, N.E. On the daily variation of albedo. Met. & Hydr. 1952, #6.

53. LOPUKHIN, E.A. Intensity of ultraviolet radiation in Tashkent. Met. & Hydr. 1956, #1.

54. LOPUKHIN, E.A. Studies of radiation fields in the lower troposphere over Tashkent on clear days. Pap. Inst. Math-Mech. Acad. Sci. Uzbek, SSR., #14, 1955.

55. MUKHENBERG, V.V. Radiation and heat balance in the Leningrad region. Met. & Hydr. 1953, #4.

56. MIAKOV, N.JA. and KAPITONOVA, I.I. Radiation and heat balance in the Turkmenistan. Met. & Hydr. 1952, #4.

57. OGNEVA, T.A. Some peculiarities of the heat balance of the ground (according to the observation at Koltushakh). Under the editorship of D.L. LAIKHTMAN. Hydromet. Publ. House, 1955.

58. SULAKVELIDZE, G.K. Albedo of the snow cover. Pap. Inst. Geophys. Acad. Sci. Gruzian SSR., Vol. 12, 1953.

59. ULANOV, KH. K. Heat sums of solar radiation in Riga. Met. & Hydr. 1952, #10.

60. FEDOSEEVA, A.I.	Albedo of the system earth-atmosphere and its distribution over the world. Pap. MGO, #41 (103), 1953.
61. SHCHERBAN, M.I.	Solar radiation in Kiev. Pap. Geophys. Obs. of Kiev, 1952, #1.
62. JAROSLAVTSEV, I.N.	Noon values of the intensity of direct solar radiation in Tashkent, Met. & Hydr. 1952, #5.
63. JAROSLAVTSEV, I.N.	Results of computation of solar energy in Uzbekistan. Published in the Book: Meteorology and Hydrology in Uzbekistan, 1955 (Available in our Library. Translator).
64. ANDRIANOV, M.S.	On the circulation factors of the climate of the western provinces of the Ukrainian SSR (excluding regions west of the Carpathians) Sci. Pap. State Univ. of Lvov, Vol. 18, #1, 1951, Geog. series.
65. BAIDAL, M.K.	On the problem of zonal circulation of the atmosphere. Pap. Hydromet. Sci-Res. Inst. of Kazakhstan, #3, 1954.
66. BAIDAL, M.KH. and SEREBRIAKOVA, A.A.	Climatic peculiarities of cold air outbreaks at Kazakhstan in the colder part of the year. Pap. Hydromet. Sci-Res. Inst. of Kazakhstan, #5, 1955.
67. BLIUMINA, L.I.	Analysis of recurrence of some synoptic processes. Hydromet. Publ. House, 1954.
68. BREGINA, A.IU.	The estimation of advection of air masses over the European USSR from the maps of absolute topography. Pap. MGO, #45 (107), 1954.
69. BUGAEV, V.A., DZHORDZHIO, V.A. and PETROSIANTS, M.A.	On the nature of the Pre-Asiatic low pressure area. Reports Acad. Sci. Uzbek SSR, 1950, #10.
70. BUDYKO, M.I. and DROZDOV, O.A.	Laws of the moisture exchange in the atmosphere. Geog. J. Acad. Sci. USSR. 1953, #4.
71. BUDYKO, M.I. and DROZDOV, O.A.	On the principles of moisture exchange in the atmosphere. Rep. Acad. Sci. USSR, Vol. 90, 1953. #2.
72. BURTSEV, A.I.	Components of the moisture exchange over the European USSR, Pap. CFI, #38 (65), 1955.
73. BUT, I.V. and PERELET, G.I.	On the dynamics of dry winds and on the possible role of the vertical component of wind in their development. Papers Hydromet. Inst. of Odessa, #7, 1955.
74. BYKOV, V.V. and MASHKOVITCH, S.A.	On the characteristics of the zonal circulation in the atmosphere. Met. & Hydr. 1956, #2.

75. VITVITSKII, G.N. On the nature of dry winds. Published in the book: "Microclimatological and climatological studies of the Pre-Caspian plain", 1953.

76. VITELS, L.A. Seasonal peculiarities of the variation of the intensity of Icelandic and North-Western-European cyclones. Geog. J. Acad. Sci. USSR, 1952, #4.

77. VITELS, L.A. Annual variation in large anomalies of precipitation. Met. & Hydr. 1952, #3.

78. VITELS, L.A. Equinoxial effect in precipitation anomalies and its long year variations. Met. & Hydr., 1952, #8.

79. VOROBEVA , E.V. and ZGURKO, V.B. Probability of precipitation in relation to synoptic situations, air temperature and moisture over the southern regions of European USSR during the warmer half of year. Pap. MGO., #45 (107), 1954.

80. VULFSON, N.I. Circulation factors of droughts in Lower-Povolzhia, Kazakhstan and Mid-Asia. Reports Acad. Sci. USSR, Vol. 76, #2, 1951.

81. GALTSOV, A.P. Conference on the moisture circulation in the atmosphere. Geog. J. Acad. Sci. USSR., 1952, #6.

82. GELMGOLTS, N.F. Aerological analysis of droughts in Kazakhstan. Pap. of the Hydromet. Sci-Res. Inst. of Kazakhstan, 1955, #5.

83. GIRS, A.A. On the problem of research of the general circulation of the atmosphere. Geog. J. Acad. Sci. USSR, 1955, #4.

84. GIRS, A.A. Some peculiarities of synoptic processes in the Arctic and their relationship with the general circulation of the atmosphere. Pap. MGO, #56 (118), 1956.

85. GIRS, A.A. Peculiarities of the planetary upper frontal zones characteristic of the basic circulation types. Met. & Hydr. 1953, #4.

86. GRIGOREVA, A.S. Circulation of moisture over the southern regions of the European USSR in different years. Pap. MGO, #50 (112), 1955.

87. GRIGOREVA, A.S. Some peculiarities of moisture circulation over the southern European USSR in different years. Pap. MGO, #45 (107), 1954.

88. DZEROZEEVSKII, B.L. Tentative data on the atmospheric circulation during the Pre-Caspian dry wind periods. In the book: "Microclimatological and climatological studies of the Pre-Caspian plain". 1953.

89. DZEROZEEVSKII, B.L. and MONIN, A.S. Types of the general circulation of the northern hemisphere and the index of circulation. Geophys. J. Acad. Sci. USSR, 1954, #6.

90. DROZDOV, O.A. Moisture circulation over the European USSR and Mid-Asia of the USSR. Pap. MGO, #45 (107), 1954.

91. DROZDOV, O.A. On the differences of the temperature and moisture in the free atmosphere on days with and without precipitation. Pap. MGO, #50 (112), 1955.

92. EVSEEV, P.K. On the nature of Summer dry winds in the south-east of European USSR. Geophys. J. Acad. Sci. USSR, 1954, #2.

93. ZHAKOV, S.I. Some information on the development of precipitation in the Lower-Povolzhia in Summer. J. All-Union Geog. Soc. Vol. 84, #1, 1952.

94. ZHAKOV, S.I. On the study of geographical peculiarities of the development of atmospheric precipitation. J. All-Union Geog. Soc. Vol. 83, #2, 1951.

95. ZAVARINA, M.B. Variation of heat and moisture of an airmass moving over a uniform surface. Pap. MGO, #48 (110), 1954.

96. ZAVARINA, M.B. On the problem of dry winds. Critical review of the literature. Pap. MGO, #30 (92), 1951.

97. ZAVARINA, M.B. Dry winds in 1949. (Aerological-synoptical analysis). Pap. MGO, #36 (98), 1952.

98. ZAVARINA, M.B. Dry winds in the south-east of European USSR. In book: Microclimatological and climatological studies in the Pre-Caspian plain, Moscow, 1953.

99. ZAVARINA, M.B. Cold dry winds. "Nature", 1955, #12.

100. ISAEV, E.A. Synoptical processes over the Atlantic and Eurasia. Editor O.A. DROZDOV, Hydromet. Publ. House, Leningrad, 1955.

101. KATS, A.L. Quantitative characteristics of the horizontal components of the general circulation of the atmosphere over the northern hemisphere. Met. & Hydr. 1955, #2.

102. KURGANSKAJA, V.M. Characteristics of drought periods from the viewpoint of the general circulation of the atmosphere. Geog. J. Acad. Sci. USSR. 1953, #2.

103. MININA, L.S. Variation of moisture of an airmass under the influence of the surface. Met. & Hydr. 1955, #5.

104. MIKHEL, V.M. On the problem of variation of the depth of pressure systems. Pap. MGO, #56 (118), 1956.

105. MISHUTIN, D.A. Dry atmospheric fronts in the southern steppes of Ukraine. Met. & Hydr. 1952, #6.

106. ORLOVA, V.V. Moisture circulation during the vegetation period of a dry year over the Western-Siberia in connection with the passage of precipitation. Pap. MGO, #50 (112), 1955.

107. PAGAVA, S.T. — Recurrence of some types of synoptic process. Met. & Hydr. 1951. #6.

108. PETROSIAN, M.A. — On the problem of development of the Siberian anticyclone. Reports Acad. Sci. Uzbek SSR, 1951, #2.

109. POGOSJAN, KH.P. — Intensity of interlatitudinal exchange of airmasses in different seasons. Met. & Hydr. 1954, #6.

110. POGOSJAN, KH.P. — Planetary frontal zones of the northern and southern hemisphere. Hydromet. Publ. House, 1955, Chief Administration of the Hydromet. Service.

111. POGOSJAN, KH.P. — Seasonal variation of planetary frontal zones. Met. & Hydr. 1954, #4.

112. POGOSJAN, KH.P. — Model for the moisture circulation in the atmosphere. Geog. J. Acad. Sci. USSR, #5, 1952, (a discussion).

113. POKROVSKAIA, T.V. and RUBINSHTEIN, E.S. — On the problem of the study of heat exchange between oceans and continents. Met. & Hydr. 1955, #3.

114. POLOZOVA, L.G. — On the characteristics of continentality of climate. J. All-Union Geog. Soc. Vol. 86, 1954, #5.

115. RAKHMANOV, V.V. — An arbitrary model of moisture circulation. J. All-Union Geog. Soc. Vol. 86, #2, 1954, (a discussion).

116. RAKHMANOV, V.V. — How great is the effect of the forests on circulation of atmospheric moisture? J. All-Union Geog. Soc. Vol. 85, #1, 1953.

117. RUDAKOV, V.E. — On the problem of internal moisture circulation. "Forest and Steppe", 1953, #3.

118. RUTKOVSKII, V.I. — On the moisture circulation within a continent. Prob. of Geog., Vol. 28, 1952.

119. SEMENOV, V.G. — Meredional and latitudinal synoptic processes over Europe in Winter months. Met. & Hydr. 1953, #8.

120. SEMENOV, V.G. — On the relationship between the atmospheric circulation and the temperature of the surface. Met. & Hydr., 1952, #1.

121. SOKOLOV, I.F. — On the problem of meteorological criterions for dry winds in the monsoon-climate. Met. & Hydr. 1954, #1.

122. USMANOV, R.F. — On the cause of the development of planetary frontal zones and subtropical high pressure belt. Met. & Hydr. 1953, #3.

123. CHROMOV, S.P. — On the problem of the origin of precipitation in the Lower-Povolzhia. J. All-Union Geog. Soc. Vol. 85, #1, 1953.

124.	CHROMOV, S.P.	On the discussion of the moisture circulation of the atmosphere within the limits of a continent. J. All-Union Geog. Soc. Vol. 83, #5, 1951.
125.	TSINZERLING, V.V.	Natural circulation of water in the atmosphere and its effect on the climate of the USSR. (Report to the meeting of scientific advisory committee of the Geog. Inst. of the Acad. of Sci., USSR, May, 1952) Geog. J. Acad. Sci. USSR, 1952, #5.
126.	SHVETS, M.E.	On the problem of moisture circulation in the atmosphere. Pap. MGO, #33 (95), 1952.
127.	SHVETS, M.E.	On the peculiarities of atmospheric motions in the equatorial region. Pap. MGO, #33 (95), 1952.
128.	SHIPCHINSKII, A.V.	On the problem of internal moisture circulation. Geog. J. Acad. Sci. USSR, 1952, #6, (a discussion).
129.	ABRAMOVICH, D.I.	Long period fluctuations of moisture in Western Siberia and its modification trends. Pap. Inst. of Transport and Energy of West Siberia, an affiliate of Acad. Sci. USSR, #3, Novosibirsk, 1952.
130.	ANOSOVA, L.S.	Variations of the dates of freezing up and breaking up of ice in West-Dvina (Düna) in connection with climatic warming. Met. & Hydr. 1955, #6.
131.	ARKHANGELSKII, V.L.	On the problem of climatic variations. Met. & Hydr. 1952, #9.
132.	BEZRUKOVA, A.JA.	The effect of solar activity and the nature of atmospheric circulation on the variation of the heights of lake levels and on draughts. Papers of the Laboratory of Lake Control, Acad. Sci. USSR, Vol. 3, 1954.
133.	BERG, L.S.	On the problematical drying out of the steppes and deserts. Geog. J. Acad. Sci. USSR, 1953, #5.
134.	BLINOVA, E.H.	On the problem of determination of sea level pressure. Reports Acad. Sci. USSR., Vol. 92, 1953, #3.
135.	BONCHIKOVSKAIA, T. V.	Some characteristics of the monsoon activity of the atmosphere. Pap. Inst. of Marine Hydrology, Vol. 4, 1954.
136.	BORISOV, A.A.	Has the climate of Leningrad changed? Leningrad, 1953 (State Univ. of Leningrad).
137.	BORISOV, A.A.	The climate of Crimea during different geological ages. Sc. pap. Univ. of Leningrad, biological, geographical and geological series, #2, 1955, #6.
138.	BUCHINSKII, I.E.	Has the climate of the Ukraine changed during historical time? J. All-Union Geog. Soc. Vol. 85, #1, 1953.
139.	BUCHINSKII, I.E.	On the problem of variation of climate of the Ukraine during historical time, Met. & Hydr., 1952, #5.

140. BUCHINSKII, I.E. Pre-historic climatic data for the region north of the Black Sea. Pap. Hydromet. Sci-Res. Inst. of Ukraine, #1, 1954.

141. BUCHINSKII, I.E. Outlines of the climate of the Russian plains. Hydromet. Publ. House, Leningrad, 1954.

142. BYKOV, V.V. On the problem of mountain effect on pressure in the mid-troposphere. Met. & Hydr. 1955, #4.

143. GRICHUK, V.P. On the post-glacial drought period in the territory of the European USSR (according to micro-palentheological data). Prob. of Geog. Vol. 24, 1951.

144. DROZDOV, O.A. On the relationship between the relative humidity and the amount and probability of precipitation. Pap. MGO, #50 (112), 1955.

145. MAKSIMOV, I.V. On the 80-year cycle of variation of climate. Reports Acad. Sci. USSR, Vol. 86, 1952, #5.

146. POGOSIAN, KH. P. Seasonal variation of the general circulation of the atmosphere. Pap. CFI. #1, 1947.

147. MARKOV, K.K. Is Central Asia becoming drier? Prob. of Geog. Vol. 24, 1951.

148. PIDOPLICHKO, I.G. and MAKEEV, P.S. On the climates and landscapes of the past in the light of paleozology and physical geography. Pap. of the Institute of Zoology of Acad. Sci. of Ukrainian SSR., #1, Kiev, 1952.

149. RAKIPOVA, L.R. On the mean annual zonal distribution of temperature in the earth's atmosphere. Pap. MGO, #33 (95), 1952.

150. RAKIPOVA, L.R. Mean annual zonal distribution of the temperature of the earth's atmosphere and factors determining it. Pap. MGO, #41 (103), 1953.

151. RUBASHEV, B.M. Long period variations of the velocity of earth's rotation and some features of the general circulation of the atmosphere of the geological past. J. All-Union Geog. Soc. Vol. 83, #2, 1951.

152. RUKHIN, L.B. Climate of the past. J. All-Union Geog. Soc. Vol. 87, #2, 1955.

153. SOKOLOV, A.A. Shortening of the length of freezing up of water-bodies in connection with climatic warming. "Nature", 1955, #7.

154. CHROMOV, S.P. and EIGENSON, M.S. Zonal peculiarities of the general circulation of the atmosphere, critical latitudes of the geoid and Solar Activity. Circular #28 of the Astronomical Obs. Univ. of Lvov, 1954.

155. SHVETS, M.E. On the hydrodynamic theory of the zonal circulation of the atmosphere. Pap. MGO, #41 (103), 1953.

156. SHULGIN, A.M. On the variation of urban climate of town Barnaul. J. All-Union Geog. Soc., Vol. 85, #1, 1953.

157. EIGESON, M.S. The Brückner cycle and solar activity. Pap. of the committee for Solar-research (at the Inst. of Astronomy Acad. Sci. USSR), 1951, #7 (21).

158. EIGESON, M.S. Geophysical manifestations of the long period cycles of solar activity. J. All-Union Geog. Soc. Vol. 83, #1, 1951.

159. EIGESON, M.S. On the possible nature of paleoclimatological variations. J. All-Union Geog. Soc., Vol. 85, #4, 1953.

160. ALISOV, B.P. On the latitudinal zonality of climate. Sci. Pap. Univ. of Moscow, physical-mathematical and natural science series, #3, #5, 1953.

161. BERLJAND, T.G. On the variation of soil moisture content and the heat balance in dry years. Pap. MGO, #29 (91), 1952.

162. BUDYKO, M.I. Climatic conditions for irrigation on continents part I and II. Geog. J. Acad. Sci. USSR, 1955, #2, #4.

163. BUDYKO, M.I. On the climatic factors of run off. Problems of physical geography, Vol. 16, 1951.

164. BUDYKO, M.I. On the transformation of solar energy at the earth's surface. Geog. J. Acad. Sci. USSR, 1954, #1.

165. VOLOBUEV, V.R. Soils and climate. Baku, 1953, Acad. Sci. Azerbaijan SSR (Inst. of Soil and Agriculture).

166. GNEDIN, N.D. Spring and Summer regime of soil temperatures in relation to their exposition. Pap. of the Inst. of Agriculture of Chuvash, Vol. 2, 1951.

167. DEMCHENKO, L.H. On the problem of evaporation from a water surface in the plains of Kazakhstan. Met. & Hydr. 1952, #10.

168. ZHEGNEVSKAJA, G.S. On the climatic factors moistening the South of European USSR. J. All-Union Geog. Soc. Vol. 86, #6, 1954.

169. ZUBENOK, L.I. On the determination of the potential evaporation in the arid regions of the USSR. J. All-Union Geog. Soc. Vol. 86, #6, 1954.

170. ZYKOV, I.V. Why the Zmein Lake dries out? J. All-Union Geog. Soc. Vol. 86, #3, 1954.

171. IVANOV, N.N. On the determination of potential evaporation. J. of All-Union Geog. Soc. Vol. 86, #2, 1954.

172. IOGANSON, V.E. An experimental study of potential evaporation in the Pre-Caspian region. In the book: Microclimatological and climatological studies of Pre-Caspian plain. Moscow, 1953.

173.	Studies of snowmelt, infiltration and dynamics of moisture. Editor P.P. KUZMIN. Hydromet. Publ. House, Leningrad 1951, Pap. of State Hydrological Inst., #32 (86).
174. KOMAROV, V.D.	On the processes of snowmelt on the territory of European USSR. Met. & Hydr. 1951. #1.
175.	On the orographic factors of the general circulation of the atmosphere. Sci. Pap. State Univ. of Kazansk, Vol. 111 #5, 1951. Authors: Smoltakov, P.T., Kozhevnikova, Z.P., Kolobov, N.V. and Fedotova, E.D.
176. PUZANOV, V.P.	On the complexity of equations expressing thermal interaction in the atmosphere. Sci. Pap. State Univ. of Moscow, physical-mathematical and natural science series, #8, 1954, #12.
177. RASPOPOV, M.P.	On the problem of moisture circulation in the subsoils of the Pre-Caspian plain. J. All-Union Geog. Soc. Vol. 86, #2, 1954.
178. RUBINSHTEIN, E.C.	On the effect of the distribution of the oceans and continents on the distribution of the air temperature. J. All-Union Geog. Soc. Vol. 85, #4, 1953.
179. SHULGIN, A.M.	The climate of soils in the European USSR in connection with the zonal distribution of soils. Geog. J. Acad. Sci. USSR, 1955, #6.
180. SHULTS, V.L.	Evaporation and condensation on the surface of snow flakes during their melting. J. of the Uzbekistan branch of the All-Union Geog. Soc. Vol. 1 (22), 1955.
181. SHULTS, V.L. and SHALATOVA, L.I.	On the dependence of the intensity of snow melt on its duration. Reports Acad. Sci. Uzbek SSR, 1952, #12.
182. ALPATEV, S.M.	Artificial irrigation as a method of combatting droughts in the irrigated regions. Collected volume of papers presented at the conference of water-economic problems of the Ukraine, KIEV, 1952.
183, ANDRIANOV, M.S.	Microclimatological peculiarities of the town of Lvov. Sci. Pap. State Univ. of Lvov. Vol. 18, Geog. series, #1, 1951.
184. ARKHIPOVA, E.P.	The influence of forest belts on the soil temperature regime. Pap. MGO, #36 (98), 1952.
185. ARKHIPOVA, E.P.	On the soil temperatures in the forest belts. Pap. MGO, #30 (92), 1951.
186. ARKHIPOVA, E.P.	On the soil temperature regime in the drained marshland. Pap. MGO, #49 (111) 1955.
187. ARKHIPOVA, E.P.	Soil temperature of forest belts and fields. Pap. MGO, #44 (106), 1954.

188. ARKHIPOVA, E.P. and GLEBOVA, M.IA.	Microclimatological peculiarities of an irrigated field. Pap. MGO, #36 (98) 1952.
189. ARKHIPOVA, E.P. and GLEBOVA, M.IA.	Some data on the climate of an irrigated field. Met. & Hydr., 1952, #6.
189 a. BABUSHKIN, I.N.	Meteorological elements and plants. Pap. State Univ. of Mid-Asia, #13, 1953.
190. BERESNEVA, I.A. and DANILOVA, L.P.	Effect of slopes of plains on precipitation and moisture circulation. Pap. MGO, #45 (107) 1954.
191. BLAGOVESHCHENSKII, E.N.	Studies of soil moisture in eastern Kara-Kuma. J. Acad. Sci. of Turkmen SSR, 1952, #4.
192. BOBROV, V.IA. and SHCHITOV, A.S.	One of many causes of drywinds in the western Pre-Caspian region "Nature", 1954, #1.
193. BUDYKO, M.I.	Changes in the heat balance discussed in connection with the realization of the Stalin plan for the modification of Nature. Met. & Hydr., 1951, #12.
194. BUDYKO, M.I.	On the influence of ameliorative measures on potential evaporation. Geog. J. Acad. Sci. USSR, 1951, #1.
195. BUDYKO, M.I.	On the hydrometeorological effectiveness of field protecting forest belts. Thesis of a memorandum. Prob. of Geog. Vol. 23, 1950.
196. BUDYKO, M.I., DROZDOV, O.A. and IUDIN, M.I.	On the quantitative estimation of changes in Nature. Geog. J. Acad. Sci. USSR, 1951, #2.
197. BUDYKO, M.I. and POGOSIAN, KH. P.	Changes in the climate of the ground layer resulting f from amelioration projects in arid regions "Nature" 1954, #5.
198. BUDYKO, M.I. and IUDIN, M.I.	On the planning of experimental studies on the meteorological effectiveness of field protecting forest-belts. Pap. MGO, 29 (91), 1952.
199. BUDYKO, M.I. and IUDIN, M.I.	On the planning of experimental studies on turbulence in neighbourhood of field protecting forest-belts. Met. & Hydr. 1951, #5.
200. BUDYKO, M.I., IUDIN, M.I. and IAKOLEVA, N.I.	Evaporation from irrigated fields and potential evaporation. Met. & Hydr., 1954, #1.
201. BUCHINSKII, I.E.	Effect of small slopes on precipitation. Met. & Hydr., 1953, #6.
202. BUCHINSKII, I.E.	Relief and precipitation. J. All-Union Geog. Soc., Vol. 86, #2, 1954.
203. VASILEV, I.S.	Freezing and thawing of soils near Moscow. "Soilstudies", 1952, #9.

204.	BERNATSKEI, D.P., VINOKUROVA, M.K., KAGANOV, M.A., ROZHANSKAIA, A.D., and CHUDNOVSKII, A.F.	The influence of forest belts on microclimate. "Forest and Steppe", 1952, #1.
205.	VOLEVAKHA, H.M. and POLOVKO, I.K.	Microclimate of ponds, water basins and irrigated areas in the southern Ukraine. Pap. Hydromet. Sci-Res. Inst. of Ukraine, #1, 1954.
206.	VORONTSOV, P.A.	Aerological condition of droughts in the Kamen steppe in the Summer of 1951. Pap. MGO, #36 (98) 1952.
207.	VORONTSOV, P.A.	Breezes of the Tsimlyansk water basin. Pap. MGO, #54 (116) 1955.
208.	VORONTSOV, P.A.	Vertical motions of the air in the region of Tsimlyansk water basin in Summer. Pap. MGO, #56 (118) 1956.
209.	VORONTSOV, P.A.	A study of the turbulence in wind over forest belts. Pap. MGO, 38 (100) 1953.
210.	VORONTSOV, P.A.	A study of trajectories of air motion and the nocturnal radiation inversion over soils in different state of drainage. Pap. MGO, 49 (111) 1955.
211.	VORONTSOV, P.A.	Some problems of the local circulation of the air. Pap. MGO, #54 (116) 1955.
212.	VORONTSOV, P.A.	An experimental study of air motion over and between the forest belt cells in the Kamen steppe. Pap. MGO, 32 (94) 1952.
213.	VORONTSOV, P.A.	Peculiarities of local winds in the Elbrus region. Pap. MGO, 32 (94) 1952.
214.	VORONTSOV, P.A. and KAZAKOV, L.A.	Peculiarities of wind regime over a cotton oasis and semidesert. Pap. MGO, #39 (101) 1953.
215.	GALAKHOV, N.N.	Influence of young forest species-belt on the melting of snow cover. In the book: Problems of the study of snow and its utilization in the nation's economy. Inst. Geog. Acad. Sci. USSR, 1955.
216.	GALAKHOV, N.N.	Relationship between the individual meteorological elements and the weather. In the book: "Microclimatological and climatological studies of the Pre-Caspian plain". Inst. Geog. and Inst. Forest Acad. Sci. USSR, Moscow, 1953.
217.	GALTSOV, A.P.	Droughts and methods of combatting them. "Science and Everyday Life" 1955, #8.
218.	GALTSOV, A.P.	How a drought develops and methods of combatting it. Scientific-popular lecture (collective farm series) "Prawda", Moscow, 1951.

219. GALTSOV, A.P.	On the climatological interaction of irrigated and non-irrigated areas. Geog. J. Acad. Sci. USSR, 1953, #3.
220. GLEBOVA, M.IA.	Some peculiarities of the temperature and moisture regime in forest plantings and fields. Pap. MGO, #30 (92), 1951.
221. GLEBOVA, M.IA.	Results of field observations on the temperature and moisture of air over drained marshland. Pap. MGO, #49 (111) 1955.
222. GLEBOVA, M.IA.	Temperature of the air in the field protecting forest belts. Pap. MGO, #36 (98) 1952.
223. GLEBOVA, M.IA.	Temperature and moisture of the air in forest belts during the vegetation period. Paper. MGO, #44 (106) 1954.
224. GNEDIN, N.D.	Spring and summer temperature regime of the soil on slopes in relation to their exposure. Pap. Inst of Agriculture of Chuvash, Vol. 2, 1951.
225. GOLUBOVA, T.A.	Some peculiarities of the moisture of air in forest belts. Pap. MGO, #36 (98) 1952.
226. GOLUBOVA, T.A.	On the radiation regime inside the forest belts. Pap. MGO, #36 (98) 1952.
227. GOLUBOVA, T.A.	Radiation balance over dry land and over different sections of drained marshland. Pap. MGO, #49 (111) 1955.
228. GOLUBOVA, T.A.	Radiation balance below the crown canopy of forest belts. Pap. MGO, #44 (106) 1954.
229. GOLTSBERG, I.A.	Night frosts over drained marshlands. Pap. MGO, #49 (111) 1955.
230. GOLTSBERG, I.A.	Variation of the duration of frost free period in forest belted fields. Pap. MGO, #36 (98) 1952.
231. GOLTSBERG, I.A.	Meteorological effectiveness of permeable forest belts of various construction. Pap. MGO, #44 (106) 1954.
232. GOLTSBERG, I.A.	Microclimatological peculiarities of drained marshlands. Met. & Hydr. 1955, #2.
233. GOLTSBERG, I.A.	On the moisture of air and evaporation inside the field protecting forest belts. Pap. MGO, #29 (91) 1952.
234. GOLTSBERG, I.A.	An expeditional study of atmospheric turbulence in the field protecting forest belts. Pap. MGO, #29 (91) 1952.
235. GRIBANOV, L.N.	A contribution to the knowledge of black storms (= dust storms. Translator) of the Kulundinsk steppe in Altai region "Soil studies", 1954, #9.

236. GUREVITS, M.I.	The influence of forest belts on snow accumulation in the Kamen Steppe. Pap. of State Hydrological Inst. #34 (88) 1952.
237. DERIABIN, D.I.	Distribution of winter precipitation and accumulation of moisture reserves in forest and field (in central Povolzhe) "Forest Industry", 1952, #2.
238. DZERDZEEVSKII, B.L.	Methods of modification of climate under conditions of the Pre-Caspian region. Geog. J. Acad. Sci. USSR, 1952, #1.
239. DZERDZEEVSKII, B.L.	Heat balance and microclimate of the Pre-Caspian estuary and dry steppe. Geog. J. Acad. Sci. USSR, 1954, #2.
240. DZETOVSKII, B.V.	Theoretical basis for the measurement of the microclimate of planted forest belts. Collected volume of Engineering Melioration Inst. of Novocherkassk, Vol. 5, 1955.
241. DROZDOV, O.A.	On some peculiarities of moisture circulation in connection with ameliorative measures. Pap. MGO, #36 (98) 1952.
242. DUBINSKII, G.P.	Microclimate of the irrigated area of the Kamen Steppe. Pap. Hydromet. Sci-Res. Inst. of Ukraine, #3, 1955.
243. DUBINSKII, G.P.	Microclimatological cross section of the Dnepr valley in the region of Kakhovki. Sci. Pap. Univ. of Kharkov, Vol. 56, 1956.
244. DUBINSKII, G.P.	On the steppe oasis Askaniia-Nova (Results of a preliminary study of micro-climatological characteristics). Sci. Pap. Univ. of Kharkov, Vol. 56, 1956.
245. EVDOKIMOV, K.T.	On the snow accumulating action of permeable forest belts. "Forest and Steppe", 1953, #1.
246. EFIMOVA, N.A.	On the influence of forest belts on the air temperature and moisture in the forest belted fields. Pap. MGO, #44 (105) 1954.
247. ZAVARINA, M.V.	Droughts and methods of combatting them. Geog. Publ. House, Moscow, 1954.
248. BUDYKO, M.I. and Collaborators.	Changes in climate resulting from the realization of Stalin's plan for the modification of Nature. Prob. of Geog., Vol. 28, 1952.
249. BUDYKO, M.I. and Collaborators. Editor POGOSIAN, KH.P.	Changes in the climate in connection with realization of Stalin's plan for modification of Nature. Hydromet. Publ. House, Leningrad, 1952.

250.		Studies of changes in hydrometeorological regimes under the influence of field protecting forest belts. Editor: P.P. KUZMIN. Hydromet. Publ. House, Leningrad, 1952. Pap. State Hydrological Inst., #34 (88).
251.	ISHERSKAIA, E.V.	Some observations on the local climate of the Volga valley. In the book: "Microclimatological and climatological studies of the Pre-Caspian plain" Moscow, 1953. (Inst. of Geog. and Inst. of Forestry of Acad. Sci. USSR.)
252.	KIRILLOVA, T.V.	Effects of irrigation on the radiation characteristics of the working surface. Pap. MGO, #37 (99) 1952.
253.	KIRILLOVA, T.V. and NESINA, L.V.	The influence of irrigation on the change of components of the heat balance in a wheat field. Pap. MGO, #53 (115) 1955.
254.	KOLDOMASOV, L.I.	Peculiarities of droughts and drywinds in West-Siberia and methods for combatting them. "All-Union association for the advancement of political and scientific knowledge". Novosibirsk's branch, Novosibirsk, 1951.
255.		A compound expedition of the Hydrometeorological Service to Pakhta-Aral in summer of 1952. Editor: D.L. Laikhtman. Hydromet. Publ. House, Leningrad 1953, Pap. MGO, #39 (101).
256.	KONDRATEV, K.IA. and MANOLOVA, M.P.	On the problem of the incoming scattered and total radiation on the surface of a slope. Met. & Hydr., 1955, #6.
257.	KONDRATEV, K.IA. and PODOLSKAIA, E.L.	The effective radiation of slopes. Geophys. J. Acad. Sci. USSR, 1953, #4.
258.	KONSTANTINOV, A.R.	On the problem of influencing atmospheric precipitation by complex measures of the plan for the modification of nature. Met. & Hydr., 1952, #8.
259.	KONSTANTINOV, A.R.	On estimating the effect of planting forest belts on atmospheric precipitation. Pap. State Hydrological Inst. #34 (88) 1952.
260.	KONSTANTINOV, A.R.	Calculation of the evaporation from agricultural fields under conditions of forest belted fields. Pap. State Hydrological Inst. #34 (88) 1952.
261.	KONSTANTINOV, A.R.	Calculation of wind speed in the system of field protecting forest belts. Met. & Hydr., 1951, #12.
262.	KOPAEV, I.D.	Influence of field protecting forest belts on the distribution of snow cover in the arid zone of the European USSR. Editor M.I. BUDYKO, Hydromet. Publ. House, Leningrad, 1955.

263.	KOPAEV, I.D.	Influence of forest belts on the accumulation of snow. Pap. MGO, #44 (106) 1954.
264.	KOPAEV, I.D.	Snow accumulation at forest belts of different construction. "Forest Industry", 1954, #12.
265.	KOSTIN, S.I.	Climatic conditions in the region of Tsimlyansk water basin. Sci. Pap. Inst. of Forestry of Voronezh, Vol. 13, 1952.
266.	KRYLOV, P.A.	On the problem of drywinds in Povolzhe, Geophys. J. Acad. Sci. USSR, 1952, #5.
267.	LAIKHTMAN, D.L. and OGNEVA, T.A.	Experimental data on the influence of irrigation on the variation of turbulent exchange in the lower layer of air (According to the data of Pakhta-Aral expedition). Pap. MGO, #39 (101) 1953.
268.	LAIKHTMAN, D.L. and TSEITIN, G.KH.	Variation of the temperature of the air in surface layers during irrigation. Pap. MGO. #39 (101) 1953.
269.	LVOVITS, M.I.	Changes in wind and water regimes of territories subjected to ameliarative works by agriculture and forestry. Pap. Inst. Geog. Acad. Sci. USSR, #64, 1955.
270.	LVOVITS, M.I.	Studies of the hydrometeorological action of planted forest belts. Pap. State Hydrological Inst. #34 (88) 1952.
271.	LIAKHOV, M.E.	Microclimatological observations in the region of Cherno-Yara of Astrakhan province. In the book: Microclimatological and climatological studies of Pre-Caspian plain. Moscow, 1953.
272.	LIAKHOV, M.E.	Data of expedition to Kamen Steppe. Editor: O.A. DROZDOV. Pap. MGO, #40 (102) 1953.
273.	MATIAKIN, G.I.	Field protecting forest belts and microclimate. Geog. Publ. House, Moscow, 1952.
274.	MIKHAILENKO, N.M. and PRIKHOTKO, G.F.	Some microclimatological peculiarities of a small irrigated valley. Pap. Hydromet. Sci-Res. Inst. of Ukraine, #1, 1954.
275.	MOLCHANOV, L.A.	Anticipated changes in climatic and hydrological conditions in Mid-Asia in connection with the development of irrigation in the southern zone. Pap. of the Uzbekistan Branch of the All-Union Geog. Soc., Vol. 1 (22) 1955.
276.	MOLCHANOV, L.A.	The role of field protecting forest zones in increasing moisture through snow accumulation. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #3, 1955.
277.	MOROZOVA, M.I.	The role of the foehn effect of mountain-valley circulation on the temperature regime in the Angrensk valley. In the book: Meteorology and hydrology in the Uzbekistan, 1955.

278. Some data on the heat balance of drained marshland and of dry land. Pap. MGO., #49 (111) 1955. Authors: E.P. ARKHIPOVA, M.IA. GLEBOVA, T.A. GOLUBOVA, E.N. ROMANOVA.

279. POLTARAUS, B.V. On the influence of field protecting forest belts on the temperature. Prob. of Geog. Vol. 28, 1952.

280. POPOV, V.P. On the changes in agroclimate in steppe and forested steppe regions of the Ukrainian SSR expected in connection with the realization of the Stalin plan for the modification of Nature. Proceedings of the meeting on water economy of the Ukraine, Kiev, 1952.

281. ROMANOVA, E.N. The effect of forest belts on the vertical structure of wind and turbulent exchange. Pap. MGO, #44 (106) 1954.

282. ROMANOVA, E.N. Evaporation over drained marshland and dry land. Pap. MGO, #49 (111) 1955.

283. ROMANOVA, E.N. On the influence of forest belts on turbulent exchange. Pap. MGO, #36 (98) 1952.

284. RUTKOVSKII, V.I. Dynamics of the climate of the State park between Pensa and Kamensk. Papers of the expedition on problems of field protecting forest belts., Vol. 2, #4, 1953.

285. SAMBIKIN, M.M. and SUVOROVA, N.D. Dry winds at Stalingrad. Scientific papers of the Pedagogical Institute of Stalingrad, 1955.

286. SAPOZHNIKOVA. S.A. On the problem of classifying forest belts as a climatic factor. Pap. MGO, #30 (92) 1951.

287. SAPOZHNIKOVA, S.A. Microclimate of irrigation fields (temperature and moisture of the air, temperature of the soil). Pap. MGO, #45 (107) 1954.

288. SAPOZHNIKOVA, S.A. Some peculiarities of the climate of oases in Mid-Asia, Pap. MGO, #30 (92) 1951.

289. SAPOZHNIKOVA, S.A. On the climate of oases in Mid-Asia. Met. & Hydr. 1952, #3.

290. SMALKO, IA.A. The zones of wind influence by forest belts of different construction. Geog. J. Acad. Sci. USSR, 1955, #5.

291. SMALKO, IA. A. On the variation of the absolute humidity in forests and in fields protected by a network of forests belts. Geog. J. Acad. Sci. USSR, 1952, #3.

292. SMALKO, IA.A. The role of field protecting forest belts in the variations of microclimate of forest belted fields under different weather conditions. In the book: Works on agroamelioration. Kiev, 1952. Inst of Agriculture and Forestry Economics of Ukraine.

293. SMIRNOV, N.V. Climatological outlines of the region studied by the expedition to the state farm Pakhta-Aral. Pap. MGO, #39 (101) 1952.

294. SMOLIAKOV, P.T. The climate of Tartar SSR in connection with the creation of Lake Kuibyshev. Sci. Pap. State Univ. Kazansk, Vol. 111, Book 7, 1951.

295. SOBOLEV, L.N. Results of observations on depth of snowcover in different remnants of summer vegetation in the forest-meadow zone of northern Tyan-Shan. Collected volume of geographical papers, #4, 1954.

296. SUMAROKOV, V.S. Influence of forest belts on snow-melt and surface runoff. "Forest and Steppe", 1952, #1.

297. SUS, N.I., GOLUBEVA, L.A., and ANDROSOVA, T.P. The improvement of microclimatological conditions in steppes for the growth of planted young tree-forest belts. Met. & Hydr., 1954, #6.

298. TEMNIKOVA, N.S. Dust storms in the Stalingrad province. Met. & Hydr., 1955, #1.

299. TEMNIKOVA, N.S. A rare occasion of surface inversion. Met. & Hydr., 1953, #2.

300. TRESHCHEVSKII, I.V. On the influence of Agricultural plants on microclimate. Met. & Hydr., 1956, #1.

301. TROITSKII, N.A. The effect of trees on city climate. Pap. of the Crimean branch of the All-Union Geog. Soc., 1954, #3.

302. FEDOROV, E.E. and CHUBUKOV, L.A. Development of droughts and possible methods for their modification. Problems of physical geography, Vol. 16, 1951.

303. FELDMAN, IA.I. Some results of microclimatological studies in the Pre-Caspian plains. In the book: Microclimatological and climatological studies of Pre-Caspian plains. Moscow, 1953.

304. FELDMAN, IA. I. and CHUBUKOV, L.A. Climate of arid regions of the USSR and means of improving it. Moscow 1955. Acad. Sci. USSR, scientific-popular series.

305. CHROMOV, S.P. Climate in the Stalin plan for the modification of nature. Sci. Pap. Univ. of Leningrad 1951, #4.

306. TSUBERBILLER, E.A. and BELUKHINA, G.V. The weakening of dry winds by forest belts. Pap. CFI, #41 (68) 1955.

307. CHUDNOVSKII, A.F. Microclimate and the heat balance of an irrigated field. In the book: Microclimatological and climatological studies of the Pre-Caspian plain, Moscow, 1953.

308. SHULGIN, A.M.	On the characteristics of distribution of snow cover on fields. In the book: Problems of snow studies and its utilization in the nation's economy. Moscow, 1955.
309. IASTREBOVA, O.P.	Climatic characteristics of the territory of Onokhaisk experimental station. Papers of the State experim. station at Onokhaisk for 1938-1949, Vol. 1, Uban-Ude, 1951.
310. BUDYKO, M.I.	Heat balance of the earth's surface. Hydromet. Publ. House, 1956. (available in our library. Translator).
311.	Agroclimatological and water resources of regions of long fallowed and virgin soils assigned, for agricultural use. Editor: F.F. DAVITAIA. Hydromet. Publ. House, 1955.
312.	Agroclimatological conditions of regions of long fallowed and virgin soils assigned for agricultural use. Editor: F.F. DAVITAIA. Hydromet. Publ. House, Leningrad, 1954.
313.	Agroclimatological reference book for the province of Moscow, Hydromet. Publ. House, Leningrad, 1954.
314. AIZENSHTAT, B.A.	Hydrometeorological effectiveness of irrigated agriculture in Golodnoi steppe. In the book: Hydrometeorological assistance to the nation's economy. (Transactions of a meeting in Tashkent, March 24-27, 1953) Tashkent, 1954.
315. AIZENSHTAT, B.A., and ZUEV, M.B.	Some peculiarities of the meteorological regime over cotton fields in semi-desert during autumn. Pap. MGO, #39 (101) 1953.
316. ALEKSANDROVA, A.G. and CHUIKOVA, A.T.	Agroclimatological characteristics of the Gremyachinsk region. In the book: Nature and Economy of Gremyachinsk region of Voronezh province, Voronezh, 1953.
317. ALLAIAZOV, A.	On the estimation of favourable climatic conditions for cotton raising in the Amu-Dary lowland. Collected vol. of Students' Pap. of the State Univ. of Mid-Asia, Vol. 5, Tashkent, 1953.
318. ALPATEV, A.M.	Potential evaporation as an approximate indicator of the water comsumption of agricultural plants. Met. & Hydr. #5, 1952.
319. ALPATEV, A.M.	On the characteristics of droughts. Met. & Hydr. 1955, #4.
320. AKHMEDOV, G.	Some characteristics of the climate of a lucerne (alfa-alfa. Translator) field. In the book: "Meteorology and Hydrology in the Uzbekistan". Tashkent, 1953 (available in our library. Translator).

321. BABUSHKIN, L.N.	Agrometeorological characteristics of the seasons. Pap. Geophys. Obs. of Tashkent, #8 (9) 1954.
322. BABUSHKIN, L.N.	Agrometeorological observations in ricefields. Pap. Geophys. Obs. of Tashkent, #8 (9) 1954.
323. BABUSHKIN, L.N.	On the methodics of the agroclimatological division of Uzbekistan. Pap. State Univ. of Mid-Asia, a new series, #28, Geog. Science Series #2, 1951.
324. BABUSHKIN, L.N.	On the sowing dates of grain-crops in the mountainous country of Uzbekistan. Pap. Geophys. Obs. of Tashkent, #8 (9) 1954.
325. BABUSHKIN, L.N.	On the air temperature and moisture in cotton and lucerne (alfa-alfa) fields in irrigated regions of Uzbekistan. Pap. Geophys. Obs. of Tashkent, #7 (8) 1952.
326. BABUSHKIN, L.N.	On the agroclimatological peculiarities of Pamir. Pap. State Univ. of Mid-Asia, new series, #50, Geog. Science Series, #5, 1954.
327. BABUSHKIN, L.N.	On the soil temperature regime of lucerne (alfa-alfa) fields in autumn. Pap. of Geophys. Obs. of Tashkent, #7 (8) 1952.
328. BABUSHKIN, L.N.	Some peculiarities of the soil temperature regime in the cotton fields. Pap. of Geophys. Obs. of Tashkent, #7, 1952.
329. BRILEVA, N.A.	On the influence of the height of agricultural crops in the forest belted fields on the thermal regime of the surface layer. Pap. MGO, #36 (98) 1952.
330. VERIGO, S.A., MOSTINSKAIA, S.B. and RAZUMOVA, L.A.	Moisture supply for summer-wheat in regions of long fallowed and virgin soils seized for agricultural use. Met. & Hydr., 1955, #5.
331. VESELOVZOROVA, R.D.	Determination of the germination period of Indian corn from the air temperature. Met. & Hydr., 1952, #12.
332. GALAKHOV, N.N.	Early-spring "sunburn" of trees. "Nature", 1955, #3.
333. DZERDZEEVSKII, B.L.	Meteorological peculiarities of 1954 over long fallowed and virgin soils in the Altai region and in North-Kazakhstan. Geog. J. Acad. Sci. USSR, 1955, #2.
334. DOLGASHEV, V.	Autumn ground frosts and plants. J. All-Union Geog. Soc., Vol. 85, #2, 1953.
335. ZININA, A.F. and FELDMAN, IA. I.	Microclimatological conditions in tea growing region in mountain foot hills of Krasnodarsk province in winter. Geog. J. Acad. Sci. USSR, 1955, #1.
336. ZININA, A.F. and FELDMAN, IA. I.	Microclimatological conditions in tea growing regions of Kuban in Summer. Geog. J. Acad. Sci. USSR, 1955, #5.

337. ZUBAREV, N.A.	Meteorological peculiarities of regions of long fallowed and virgin soils assigned for agricultural use. In the book: "Manual for agricultural specialists in (agricultural)use of long fallowed and virgin soils". Moscow, 1954.
338. ZUEV, M.V.	On the formation of temperature inversions over a cotton field. Pap. Geophys. Obs. of Tashkent, #8 (9) 1954.
339. ZUEV, M.V.	On the formation of microclimate in the cotton fields. Tashkent, 1955. A publication of Inst. Math-Mech. Acad. Sci. Uzbekistan SSR.
339 a. ZUEV, M.V.	The same by Hydromet. Publ. House, 1956.
340. ZUEV, M.V. and CHERTANOVA, N.A.	Some peculiarities of the microclimate in cotton fields. In the book: "Hydrometeorological assistance to the nation's economy". (Transactions of the meeting March 24-27, 1953). Tashkent, 1954.
341. KABANOV, P.G.	Weather conditions of the year 1950/1951 in the province of Saratov. In the book: A brief summary of scientific-research activities of the South-East Inst. of Agriculture in 1951. Saratov, 1952.
342. KIRILOVA, T.V.	Heat balance in the wheatfields. Met. & Hydr. 1955, #2.
343. KLIUCHNIKOV, IU.I	On the agroclimatological possibilities of expanding the acreage of winter and summer wheat in north-eastern Kazakhstan. Prob. of Geog., Kazakhstan, #1, 1956.
344. KOPYT, A.D.	Characteristics of soil moisture supply to basic agricultural plants in the grain regions of the Kazakhstan. Pap. Hydromet. Sci-Res. Inst. of Kazakhstan, #4, 1955.
345. KULIK, M.S.	Some characteristics of drought damage. Met. & Hydr. 1952, #9.
346. KULIK, M.S.	On the estimation of drought damage. Met. & Hydr. 1952, #1.
347. KURGUZOV, IA.V.	Agrometeorological conditions in the Bashkir Autonomous SSR, Ufa, 1952.
348. LIATKOVSKII, A.K.	Phenological phases of mandarine "Unishu" in the western Gruzia (Georgia) in relation to meteorological factors. Pap. CFI, #37 (64) 1954.
349. MOSTINSKAIA, S.B.	Agrometeorological conditions of the initial growth phase of summer-wheat in the territory of Kuibyshev irrigation system. Pap. CFI, #29, (56) 1953.

350. MOSTINSKAIA, S.B.	Soil moisture regime of fields under basic crop-rotation in the conditions of forest belted fields of the region east of the Volga. Pap. CFI, #33 (60) 1954.
351. OKUSHKO, A.A.	Agrometeorological characteristics of conditions of wintering of winter cultures in the territory of Kuibyshev irrigation system. Pap. CFI, #29 (56) 1953.
352. OSTROUMOV, S.	The climate and agricultural industry of Irkutsk province. Irkutsk, 1951.
353. PAVLOVSKII, E.S.	The characteristics of microclimatological conditions in oak forest-belts planted in the "alley" system. Met. & Hydr., 1956, #2.
354. PETELIN, B.N.	Soil-climatological conditions of Vladimir province. Vladimir, 1951.
355. PROTSEROV, A.V.	Characteristics of droughts during the agricultural vegetation period in the territory of Kuibyshev irrigation system. Pap. CFI, #29 (56) 1953.
356. ROZHANSKAIA, O.D.	The calculation of total evaporation from irrigated grain fields. In the book: Microclimatological and climatological studies of the Pre-Caspian plain. Moscow, 1953.
357. RUSIN, N.P.	Physical-meteorological conditions of dry winds in the agricultural fields. Pap. MGO, #53 (115) 1955.
358. SABININA, I.G.	The effect of temperature on the development of first spring leaves on mulberry trees in Uzbekistan. Pap. CFI, #37 (64) 1954.
359. SAMOKHVALOV, N.F.	Agroclimatological determination of dates for spring field operations in the regions of long fallowed soils in North-Kazakhstan, Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #4, 1955.
360. SELISHCHENSKAIA, A.A.	Survey of phenological observations for 1950. J. All-Union Geog. Soc., Vol 83, #4, 1951.
361. SELISHCHENSKAIA, A.A.	Survey of phenological observations for the Summer of 1950. J. of All-Union Geog. Soc., Vol. 83, #1, 1951.
362. TEMNIKOVA, N.S.	Night frosts over plowed soil and over vegetation covered soil. Met. & Hydr. 1955, #5.
363. TERENTEVA, N.L. and GURINOVA, L.V.	Effect of field protecting forest belts on the fertility of soils in the interforested fields. Pap. Inst. Agro-Forestry Amelioration in the Ukraine, Kiev, 1952.
364. TIURIN, A.V.	Seasonal growth of oak-trees and their under-growth in the European USSR. Bulletin of the engineering-technique association of forestry industry and forestry economics. State Forestry Department, Moscow-Leningrad, 1954.

365.	ULANOVA, E.S.	Agroclimatological conditions for the autumn development and growth of winter cultures in Western-Siberia. Publication of CFI, Moscow, 1954.
366.	FEDOSEEV, A.P.	On the agroclimatological conditions for cultivation of sown grass in the semidesert zone. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan #4, 1955.
367.	FOMINA, N.A.	Components of radiation balance over a cotton field. Pap. State Univ. of Mid-Asia, new series, #58, physical-mathematical sciences, #11, Tashkent, 1954.
368.	TSUBERBILLER, E.A.	Agroclimatological characteristics of dry winds in the territory of Kuibyshev irrigation system. Pap. CFI, #29 (56) 1953.
369.	TSUBERBILLER, E.A. and KRASNITSKII, G.A.	The effect of low air moisture on the growth of wheat in irrigated fields. Pap. CFI, #37 (64) 1954.
370.	AKIMOVITS, T.I.	Height of the tropopause over the European USSR in the spring season. Pap. Hydromet. Inst. of Odessa, #7, 1955.
371.		Reference book of actinometry. Editor I.N. TAROSLAVETS. Hydromet. Service of Uzbek SSR. 1-Edition, 1953, 2-edition 1954, 3rd edition 1956, Geophys. Obs. of Tashkent.
371a.	ALISOV, B.P.	Climatical regions of foreign lands. Geog. Publ. House, 1950.
372.	ANTONOV, B.S.	On the climatic divisions of Tuvy. J. All-Union Geog. Soc. Vol. 86, #6, 1954.
373.	ARKHIPOVA, E.P.	Temperature maps of bare soil. Pap. MGO, #45 (107) 1954.
374.	BABUSHKIN, L.N.	Climate of the Uzbek SSR. Tashkent, 1953.
375.	BORJSOV, A.A.	How comprehensive is our knowledge of the climate of Crimea? Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #3, 1955.
376.	BORJSOV, A.A.	On the principles of climatic division. J. All-Union Geog. Soc., Vol. 87, 1955, #3.
377.	BORTSOV, G.N. and KAPITONOVA, I.I.	Maximum air-temperatures in Turkmenistan. J. Acad. Sci. Turkmen SSR, 1952, #4.
378.	BRUDIN, I.D.	Snow storms in the plains below the Ural. J. All-Union Geog. Soc., Vol. 83, #2, 1951.
379.	BUGAEV, V.A.	A study of the climate of Mid-Asia from the dynamic-stochastic point of view, Pap. Geophys. Obs. of Tashkent, #5 (6) 1951.

380. VEISOV, K.	The climate of north-eastern Turkmen. Sci. Pap. Univ. of Turkmen, #4, 1955.
381. GAVLINA, G.P.	The climate of Khakassi. In the book: "Conditions of Nature and agriculture in the Khakassk autonomic territory." Moscow, 1954.
382. GALAKHOV, N.N.	Climate of the Priangar and the upper Lena basin. Pap. Geog. Inst. Acad. Sci. USSR, #64, 1955.
382a. VITVITSKII, G.N.	The climate of Japan. Geog. Publ. House, 1954.
382b. VITVITSKII, G.N.	The climate of North-America, Geog. Publ. House, 1953.
383.	Hydrometeorological observations on board of Antarctic Whale-fleet flagship "Slava" in 1949/50. Editor: L.F. RUDOVITS. Hydromet. Publ. House, 1954. Pap. State Institute of Oceanography, #24 (36), 1954.
384. DMITRIEVA, G.B.	Latest spring and earliest autumn ground frosts in Moscow province. Pap. CFI, #31 (58) 1954.
385. ZUBKOV, E.F.	July ground frosts in Molotov province. Pap. state Inst. of Agriculture of Molotov, Vol. 13, 1951.
386. IVANOV, N.N.	On the annual variations of atmospheric precipitation. J. All-Union Geog. Soc., Vol. 87, #6, 1955.
387. KARETNIKOV, K.A.	Temperature characteristics of the seasons in Mid-Asia according to data of the Geophysical Observatory of Tashkent. Pap. Inst. Math-Mech. Acad. Sci. Uzbek SSR, #12, 1953.
388.	Climate of the oceans. Maritime atlas, Vol. II, published by the Supreme Naval Staff, 1953.
389.	Climatic data for the region between the Volga and Urals. Editor: S.A. SAPOZHNIKOV, Hydromet. Publ. House. Leningrad, 1951.
390. KONOPLEV, N.P.	Experience in the classification of climates of the world's oceans. Pap. Inst. of Oceanography, #21 (33) 1952.
391. KOSTIN, S.I.	Climatic zones and regions in the central and eastern forested-steppes and in steppes of the Russian plain. Pap. State Univ. of Voronezh, Vol. 30, collected papers of the department of geography, 1954.
392. LOPUKHIN, E.A.	Actinometric observations in Turkestan. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, Tashkent, 1955.
393. LVOVA, S.N.	Snowcover in Tashkent. Pap. Geophys. Obs. of Tashkent, #8 (9) 1954.

394.	MOLCHANOV, L.A.	A new map of the potential evaporation for the territory of Mid-Asia. In the book: Meteorology and Hydrology in the Uzbekistan, 1955.
395.	MOROZOVA, M.I.	Results of statistical-stochastical analysis of the anomalies of precipitation in Tashkent. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953, Geophys. Series.
396.	MURZAEV, E.M.	A scheme of physical-geographical division of Mid-Asia. Geog. J. Acad. Sci. USSR, 1953, #6.
397.	MUZANOVA, A.A.	Snowcover in the south-eastern USSR. "Agriculture of the Povolzhia" 1955, #3.
398.	NAVROTSKAIA, V.S.	On climatological boundaries in the Pre-Black Sea steppe. Pap. Hydromet. Inst. of Odessa, #7, Kiev, 1955.
399.	NAZAROV, V.S. and RYBNIKOV, A.A.	Hydrometeorological observations on board the Antarctic Whale-fleet flagship "Slava" in 1951/52. Editor: L.F. RUDOVITS. Pap. State Inst. of Oceanography, #25 (37). Hydromet. Publ. House, Leningrad, 1954.
400.	ORLOVA, V.V.	A climatic sketch of Barabinsk's plain. Editors: M.I. BUDYKO and T.V. POKROVSKII, Hydromet. Publ. House, Leningrad 1954.
401.	PONOMARENKO, I.N.	Unusual snowstorms in the eastern parts of the northern Caucasus. Met. & Hydr., 1955, #1.
402.	POPOV, N.I.	Tornadoes on the coast of the Black Sea. Met. & Hydr., 1955, #5.
403.	PUZYREVA, A.A.	Climatic conditions in the southern part of the Kazakhstan province of the Kazakh SSR, Moscow, 1953. Inst. Geog. Acad. Sci. USSR.
404.	ROMANOV, N.N.	On severe and long enduring cold waves in Mid-Asia. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14 1955.
405.	SAMOKHVALOV, N.F.	Dry winds of Kazakhstan. Pap. Hydro-Met. Sci.-Res. Inst. of Kazakhstan, #1, 1953.
406.	SEMENOVA, O.A.	On some precipitation anomalies in Mid-Asia. In the book: Meteorology and Hydrology in the Uzbekistan, 1955.
407.	SIROTOV, K.M.	A short climatological sketch of the western region of the north-eastern part of the Atlantic Ocean. Pap. State Inst. of Oceanography, #20 (32) 1952.
408.	SORKINA, A.I.	A survey of hydrometeorological conditions for the sea route Odessa-Valadivostok. Pap. State Inst. of Oceanography, #21 (33) 1952.

409. STEPANOV, N.D.	Weather of the Mid-Urals, Sverdlovsk, 1955.
410. TAUBER, G.M.	Hydrometeorological observations on board the Antarctic whale fleet flagship "Slava" in 1947/48, and 1948/49. Editor: L.F. RUDOVITS. Pap. State Inst of Oceanography, #19 (31). Hydromet. Publ. House, 1951.
410a. TAUBER, G.M.	Antarctica. Basic features of the climate and weather. Hydromet. Publ. House, Moscow, 1956.
411. TAUBER, G.M.	On the climate of the Antarctic "Geography in Schools", 1952, #4.
412. TAUBER, G.M.	Basic features of the climate of the Antarctic. Met. & Hydr., 1956, #1.
413. UTESHEV, A.S.	Atmospheric droughts in the northern part of Kazakhstan. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #1, 1953.
414. FELDMAN, IA.I. and SHVAREVA, IU. N.	Climatic conditions in the territory assigned for agricultural use in northern Kazakhstan and in the foot hills of the Altai. Geog. J. Acad. Sci. USSR, 1955, #2.
415. CHERKASOV, V.M.	Some conclusions drawn from experience of temperature measurements in the free atmosphere over Tashkent. Pap. Geophys. Obs. of Tashkent, #5 (6) 1951.
416. AIZENSHTAT, B.A.	A practical method for the determination of the components of heat balance for the earth's surface. Pap. of Geophys. Obs. of Tashkent, #5 (6) 1951.
417. ALEKSEEV, G.A.	Determination of the probability of hydrological and climatological phenomena recurring several times in a year. Pap. State Hydrological Inst., #43 (97) 1954.
418. ARKHIPOVA, E.P.	A method for indirect determination of the temperature of bare soil. Pap. MGO, #30 (92) 1951.
419. BOGOSLOVSKII, B.B.	On the computation of atmospheric precipitation according to hypsometrical data. Met. & Hydr., 1951, #5.
420. BUDYKO, M.I., BERLJAND, T.G. and ZUBENOK, L.I.	Methodics of climatological computation of the components of heat balance. Pap. MGO., #48 (110) 1954.
421. BUDYKO, M.I., and EFIMOVA, N.A.	On the precision of maps of heat balance. Pap. MGO, #50 (112) 1955.
422. VORONTSOV, P.A.	On the methodics of aeroclimatological working up of observations from balloon ascents. Pap. MGO, #47 (109) 1954.

423.	GOLUB, E.V.	An analytical method for the construction of the curve of annual air temperature variation. Pap. Hydromet. Inst. of Odessa, #7, 1955.
424.	GOLUBOV, R.S.	On the application of climatological data for long range weather forecasting. Met. & Hydr., 1953, #9.
425.	GUTERMAN, I.D., DUNAEVA, S.I. and MAMAEVA, L.V.	On the application of the method of differences for aeroclimatological analysis of wind data. Pap. Hydro-Met. Sci.-Res. Archive, #2, 1955.
426.	DROZDOV, O.A.	Space-time characteristics of the climate and their practical importance. Sci. Pap. State Univ. of Kazakhstan, Vol. 115, #5, 1955.
427.	EVSEEV, P.K.	Experience gained by mechanical analysis of meteorological observations for agriculture. Met. & Hydr., 1954, #6.
428.	IVANOV, N.N.	On the determination of the continentality of a climate. J. All-Union Geog. Soc., Vol. 85, #4, 1953.
429.	KLIUCHNIKOV, IU. I.	On the complex characteristics of climatic elements. Sci. Pap. State Univ. of Kazakhstan, Vol. 18, #2, 1954.
430.	KOLESNIKOV, A.R. and PIVOVAROV, A.A.	On the computation of the heat balance and its individual components from the air temperature. Pap. Inst. of Marine Hydrology., Vol. 6, 1955.
431.	MEZENTSEV, V.S.	Again on the computation of the mean total evaporation. Met. & Hydr., 1955, #5.
432.	NAZAROVA, I.V., SIDOROVA, I.I., and BOBRIKOVA, V.M.	The distribution of air temperature and wind speed according to direction of the wind. Editor: V.N. SOKOLOVA. Hydromet. Publ. House, Moscow, 1955.
433.	PED, D.A.	On the determination of the dates of steady transition of air temperature through certain values. Met. & Hydr., 1951, #10.
434.	POKROVSKAIA, T.V.	Some results of work on the climatological reference book for the individual provinces of the USSR. Met. & Hydr., 1952, #10.
435.	SAMOCHKIN, V.M.	On the application of the heat balance equation with the improved equation for the heat losses from a water surface. Met. & Hydr., 1956, #2.
436.	SAPOZHNIKOVA, S.A.	A contribution to the methodics of the computation of probability of mean decade temperatures. Pap. CFI, #41 (68) 1955.
437.	FELDMAN, IA. I. and CHUBUKOV, L.A.	Climate and Weather. "Nature" 1953, #10.

II SYNOPTIC METEOROLOGY

Results of a great number of research papers by Soviet authors in the field of synoptic meteorology, as well as the experience of forecasters of the Hydrometeorological Service, in particular those of the Central Forecasting Institute in composing different types of forecasts, are compiled in a collective work (1) published under the title: "Manual of Shortrange Forecasting". This book, taking cognizance of published research results by Soviet and foreign meteorologists, is the first of its kind. The "Manual" consists of two parts and contains sufficiently complete systematic account of current synoptic methods of shortrange forecasting. A more detailed discussion of problems referred to in "The Manual" can be found in the following literature references from 1951-1956.

The general problems of cyclogenesis and anticyclogenesis, the theory of local change of pressure, temperature and moisture of the atmosphere, being quite essential factors in the contemporary state of our science, have been discussed in papers (2-29).

Papers (30-36) deal with the vertical motions in the surface layer of the atmosphere and with their calculations from the pressure and windfield.

Synoptic-empirical research papers (37-76) discuss the space structure of pressure systems, conditions of their development and motion as well as the changes caused by them and by other factors in the pressure and temperature fields at different levels of the atmosphere and in different physical-geographical regions of the USSR.

Papers (77-88) analyze theoretical models of frontogenesis, space structures of atmospheric fronts and cloud systems, the micro-structure of clouds and results of studies of airmass clouds, their development and structure.

Studies of organized vertical motions are essential to the analysis and derivation of quantitative forecast methods for showers and steady rains. Therefore, much attention has been paid to the theoretical as well as to the empirical study of shower-developing factors and the vertical motions in frontal zones. The results of these studies, as well as the results of studies of individual elements of the weather (cloudiness, fog; nightfrosts, snowdrifts, etc., etc.) and methods for forecasting them are discussed in papers (89-150).

A great number of empirical studies in synoptic meteorology were carried out in connection with an attempt to improve our synoptic long range forecast method. Papers (151-167), making use of aerological data, deal with the individual aspects of Multanovski's method (for example with natural synoptic periods and seasons, extreme seasons, etc., etc.). Methodical problems of long range forecast methods based on our knowledge of the general circulation of the atmosphere and on its relation to the interaction of surface and solar activity are discussed in papers (168-182). The possibility of long range forecasting by other methods and other related problems of synoptic meteorology are analyzed in papers (183-194).

Fundamental principles of a macro-circulation method of long range forecasting for the Arctic have successfully been worked out by the Arctic Research Institute (195-196), enabling one to forecast weather 4-5 months ahead as is necessary for composing long range ice forecasts.

LITERATURE

1.		Manual of shortrange weather forecasts, part I and II. Hydromet. Publ. House, 1954-1955.
2.	BERLIAND, M.E. and ZAVARINA, M.V.	On the heat transformations of moving air masses. Pap. MGO, #33 (95), 1952.
3.	BUGAEV, V.A.	On the order of magnitude of the derivatives of pressure and temperature fields of the atmosphere. Geog. J. Acad. Sci. USSR., #4, 1952.
4.	BUGAEV, V.A.	On the sign of pressure variations in basic types of upper frontal zones. Reports Acad. Sci. Uzbek SSR, #4, 1952.
5.	BUGAEV, V.A.	Quasi-stationary anticyclones. In the book: "Microclimate of the Pre-Caspian Plain". Publication Acad. Sci. USSR, 1953.
6.	BYKOV, V.V.	On the effect of mountains on the variation of pressure in the mid-troposphere. Met. & Hydr., #4, 1955.
7.	GUBIN, V.I.	On a method of computing in advance the advective changes of temperature and pressure. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953.
8.	GUBIN, V.I.	A generalization of the proposition of Bjerkness. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953.
9.	DIUBIUK, A.F.	Variation of humidity over a water surface. Pap. CFI, #26 (53), 1951.
10.	MATVEEV, L.T. and MORSKOI, G.I.	Variation of pressure and temperature under the influence of vertical motions. Met. & Hydr., #9, 1951.
11.	MATVEEV, L.T.	On the advective-dynamic theory of cyclogenesis and anticyclogenesis. Pap. V.G.M.F. SA, #5, 1952.
12.	MATVEEV, L.T.	Variations of temperature and pressure in the lower and mid-troposphere. Pap. V.G.M.F. SA, #8, 1953.
13.	MATVEEV, L.T.	Quantitative analysis of condition of vortex developments in the atmosphere. Pap. V.G.M.F. SA, #12, 1955.
14.	MERTSALOV, A.N.	Role of the divergence and convergence of the wind in the variation of cyclonic and anticyclonic activity. Met. & Hydr., #4, 1956.
15.	MONIN, A.S.	On the perspectives of development of shortrange forecasting. J. VGO, #2, 1952.

16. MORSKOI, G.I. Theoretical model of shortrange forecasting of pressure and temperature according to I.A. KIBEL. Met. & Hydr., #2, 1951.

17. MORSKOI, G.I. On the convective theory of atmospheric pressure variations. Met. & Hydr., #1, 1953.

18. NOVIKOV, B.M. Indirect physical factors of pressure variations. Pap. V.G.M.F. SA, #5, 1952.

19. PETROSIANTS, M.A. Development of a cyclone and the structure of the thermal-isobaric field. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953.

20. ROMOV, A.I. On the basic factors of pressure change. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #5, 1956.

21. SLAVIN, I.A. Analysis of meteorological temperature problems from the view point of the second law of thermodynamics. Pap. V.G.M.F. SA, #5, 1952.

22. SMIRNOV, P.I. On the works of P.I. BROUNOV in synoptic meteorology. Pap. V.G.M.F. SA, #5, 1952.

23. TITOV, S.I. Physical explanation of some concepts of the KIBEL theory. Pap. V.G.M.F. SA, #5, 1952.

24. TITOV, S.I. On the basic concepts of advective-dynamic analysis and the hydrodynamic theory of pressure changes. Pap. V.G.M.F. SA, #8, 1953.

25. USPENSKII, B.D. On the utilization of wind observations for the prognosis of atmospheric pressure. Met. & Hydr., #2, 1954.

26. USPENSKII, B.D. Theory of local changes in the contour height of isobaric surfaces. Met. & Hydr., #5, 1954.

27. USPENSKII, B.D. Theory of local changes of surface pressure. Met. & Hydr., #1, 1955.

28. CHROMOV, S.P. On contemporary theories of cyclogenesis. J. VGO, Vol. 84, #5, 1952.

29. IUDIN, M.I. One principal generalization of the pressure topography method. Met. & Hydr. #10, 1952.

30. DIUBIUK, A.F. Vertical velocities resulting from friction. Pap. CFI, #26 (53), 1951.

31. ZUBRIAKOV, V.A. On the computation of vertical velocities in the frictional layer. Pap. V.G.M.F. SA, #8, 1953.

32. MATVEEV, L.T. Vertical motions in the boundary layer of the atmosphere. Geophys. J. Acad. Sci. USSR, #5, 1955.

33.	MERTSALOV, A.N.	Determination of vertical velocities in the frictional layer from a surface pressure pattern having circular isobars. Met. & Hydr., #11, 1951.
34.	MERTSALOV, A.N.	Quantitative determination of organized vertical motions from the pressure field. Pap. CFI, #45 (72), 1956.
35.	MORSKOI, G.I.	On the problem of the computation of vertical velocity in the air. Met. & Hydr., #1, 1954.
36.	ORLOVA, E.M.	On the calculation of vertical velocities from the windfield. Met. & Hydr., #1, 1955.
37.	BELOV, P.N.	Study of the contribution of individual layers of the atmosphere to the variation of surface pressure in different synoptic conditions. Met. & Hydr., #6, 1954.
38.	BUGAEV, V.A.	Application of thickness maps for forecasting synoptic conditions. Pap. Math.-Mech. Inst. Acad. Sci. Uzbek, SSR, #14, 1955.
39.	BUGAEV, V.A., DZHORDZHIO, V.A., SARYMSAKOV, T.A. and PETROSIANTS, M.A.	The nature of the pre-Asiatic low pressure area. Reports Acad. Sci. USSR., Vol. 23, #2, 1951.
40.	BUSHUK, V.I.	Forecasting the displacement of cyclones by means of the structure of the thermal-isobaric field. Met. & Hydr., #1, 1953.
41.	VASIUKOV, K.A.	Analysis of local pressure variations and the conditions for cyclogenesis in the troposphere. Pap. CFI., #45 (72), 1956.
42.	VETLOV, I.P.	Variation of the temperature field with height. Met. & Hydr., #12, 1952.
43.	GAIGEROV, S.S. and KASTROV, V.G.	Thermal transformation of a moving airmass according to data from free balloon flights. Pap. CAO, #6, 1952.
44.	GAIGEROV, S.S. and KASTROV, V.G.	Some generalizations of the relative thermal transformation of air masses derived from free-balloon flight data. Pap. CAO, #13, 1954.
45.	DZHORDZHIO, V.A. and PETROSIANTS, M.A.	The summer anticyclone over Tibet. Reports Acad. Sci. Uzbek, SSR, #8, 1950.
46.	DZHURAEV, A.D.	The relationship between interdiurnal variation of pressure and temperature at different heights over the Arab Sea. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
47.	ZAVARINA, M.V.	Aerosynoptical analysis of the thermal transformation of cold air masses. Pap. MGO, #41 (103) 1952.

48. ZAVARINA, M.V. — Changes in the heat and moisture content of an air mass moving over a uniform surface. Pap. MGO, #48 (110), 1954.

49. ZAVARINA, M.V. — Temperature and moisture variations of the air during its transformation in quasi-stationary anticyclones over the European USSR. Pap. MGO, #55 (117), 1955.

50. KASHIN, K.I. and GRITSENKO, M.V. — On the displacement of anticyclones. Met. & Hydr., #6, 1954.

51. KASHIN, K.I. and GRITSENKO, M.V. — On pressure variations at the earth's surface. Met. & Hydr., #5, 1954.

52. KLIUCHAREV, S.S. — On the computation of temperature advection for aerological analysis. Met. & Hydr., #3, 1951.

53. KLIUCHAREV, S.S. — On the utilization of extrapolation equations for the forecasting of displacements of centres of pressure systems. Met. & Hydr., #3, 1956.

54. KOMISAROVA, L.N. — Recurrence of southerly cyclones over Mid-Asia and Kazakhstan. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #5, 1955.

55. LOMONOSOV, E.G. — The distribution of vertical velocities with height in the frictional layer. Pap. V.G.M.F. SA, #11, 1955.

56. MERTSALOV, A.N. — On the determination of the "vorticity component" of the pressure change from absolute topography maps. Met. & Hydr., #6, 1955.

57. MIKHEEV, V.M. and PETROVA, A.F. — Some verification results on the laws governing divergence and convergence of upper winds. Met. & Hydr., #1, 1954.

58. MIKHEEV, V.M. — On the motion of pressure systems and their variation in intensity. Pap. MGO, #56 (118), 1956.

59. PED, D.A. — Interdiurnal variations of height of the 500 mb pressure surface. Met. & Hydr., #7, 1953.

60. PETROSIANTS, M.A. — Development of a cyclone and the structure of the thermal-isobaric field. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953.

61. PETROSIANTS, M.A. — On the scale of orographic influences on synoptic processes. Methodical instructions (#27) for operational forecasting. Hydromet. Service of Uzbek SSR. Tashkent, 1951.

62. PETROSIANTS, M.A. and CHERNYSHEVA, O.N. — Thermal-isobaric fields in the regions of intense pressure variation. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.

63. PINUS, N.Z. — Peculiarities of vertical motions in the free atmosphere. Pap. CAO, #6, 1952.

64. POGOSIAN, KH.P. and BURTSEV, A.I. — The effect of vertical motions on the change of the thermal field of the atmosphere. Met. & Hydr., #3. 1955.

65. POGOSIAN, KH.P. — Variation of the air temperature in a developing cyclone. Met. & Hydr., #1, 1956.

66. POGREBNYI, E.D. and SKALIARSKII, O.M. — On the motion of Balkan cyclones over the territory of European USSR, Met. & Hydr., #1, 1954.

67. POLUEKTOVA, I.R. — On the computation of the advective changes of air temperature from pilot-balloon data. Pap. MGO, #27 (89), 1951.

68. PONOMARENKO, I.N. — The migration of anticyclones at zonally situated mountain-ranges of Europe and Mid-Asia. Met. & Hydr., #5, 1953.

69. PONOMARENKO, I.N. — Synoptic conditions of the displacement of anticyclones in the Ukraine. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #5, 1956.

70. PONOMARENKO, I.N. — The effect of Black Sea depression on the distribution of precipitation anomalies. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #5, 1956.

71. POPOV, G.F. — The importance of temperature contrasts in the transformation of the lower tropospheric pressure field. Pap. V.G.M.F. SA, #12, 1955.

72. ROMANOV, N.N. — On long and intense cold spells in Mid-Asia. Pap. Inst. Math-Mech. Acad. Sci. Uzbek, SSR, #14, 1955.

73. ROMANOV, N.N. — Some peculiarities of the motion of anticyclones over Mid-Asia and its adjacent territories. Met. & Hydr., #6, 1955.

74. SERDIUK, V.N. — On the space distribution of the local pressure change in relation to the development of cyclones and anticyclones. Pap. V.G.M.F. SA, #12, 1955.

75. USMANOV, R.F. — On the causes of development of planetary frontal zones and the subtropical high pressure belt. Met. & Hydr., #3, 1953.

76. KHANEVSKAIA, I.V. — Vertical motions of the air in anticyclones. Pap. CAO, #6, 1952.

77. BUGAEV, V.A. — Planetary frontal zones and cyclogenesis. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.

78. BUGAEV, V.A. and DZHORDZHIO, V.A. — On some problems of frontal analysis. Met. & Hydr., #3, 1951.

79. VETLOV, I.P. — Frontogenesis and the transformation of upper deformation fields. Pap. CFI, #20 (47), 1951.

80.	GUBIN, V.I.	On the theory of frontogenesis. Reports Acad. Sci. Uzbek SSR, #9, 1952.
81.	GUBIN, V.I.	A contribution to the theory of local frontogenesis. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
82.	ZUBIAN, G.D.	Practical problems in frontal analysis. Methodical instructions, #11, 1951.
83.	ZUBIAN, G.D.	Problems of space structure and the analysis of fronts. Pap. CFI, #25 (52), 1951.
84.	ZUBIAN, G.D.	On the planetary frontal zones. Met. & Hydr., #7, 1952.
85.	ZUBIAN, G.D.	On the vertical extent of tropospheric frontal discontinuities. Met. & Hydr., #11, 1952.
86.	MATVEEV, L.T.	The geostrophic windfield near frontal surfaces of the atmosphere. Pap. V.G.M.F. SA, #5, 1952.
87.	MISHUTIN, D.A.	"Dry" atmospheric fronts in the southern steppes of the Ukraine. Met. & Hydr., #6, 1952.
88.	PETROSIANTS, M.A.	Frontogenesis and the development of cyclones and anticyclones. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
89.	BACHURINA, A.A. and CHERKASSKAIA, V.M.	The development of steady rains over the central provinces of European USSR from 12-16 August, 1950. Met. & Hydr., #1, 1951.
90.	BACHURINA, A.A. and TURKETTI, Z.L.	On the development of precipitation. Pap. CFI., #25 (52), 1951.
91.	BEZVERKHNIAIA, SH.A.	The synoptic conditions of droughts in the western Kazakhstan. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan. #5, 1955.
92.	BERLJAND, M.E.	Temperature variations in the surface layers of the atmosphere and the forecasting of ground frosts. Geophys. J. Acad. Sci. USSR., #2, 1953.
93.	BERLJAND, M.E.	A method for forecasting radiation fogs. Pap. MGO, #48 (110), 1954.
94.	BOGATYR, L.F. and ROMOV, A.I.	Characteristics of the atmosphere during thunderstorms and showers. Pap. Geophys. Obs. of Kiev #1, 1952.
95.	BORISENKOV, E.P.	Application of the theory of S.I. TROITSKII for determination of the windfield in the upper troposphere. Met. & Hydr., #1, 1954.

96. BURKOVA, M.V.	Analysis of fronts by vertical cross-sections. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
97. BURTSEV, A.I.	The development of precipitation in connection with variations in the moisture content of the air and the vertical velocities in a cyclone. Met. & Hydr. #1, 1956.
98. BURMAN, E.A.	The results of computing in advance the daily variation of temperature in the coastal zone. Met. & Hydr., #11, 1952.
99. VETLOV, I.P. and PETRENKO, I.V.	Precipitation at cold fronts in the central part of the European USSR during the warmer half of the year. Hydromet. Publ. House, 1955.
100. VOROBEV, V.I.	Some results of the comparison of geostrophic, gradient and actual winds in the 300 mb pressure surface. Pap. V.G.M.F. SA, #12, 1955.
101. VORONTSOV, P.A.	On convective motions in the surface layers of the atmosphere. Pap. MGO, #54 (116), 1955.
102. GAVRILENKO, N.M.	Synoptic conditions for precipitation in the province of Kiev. Met. & Hydr., #4, 1955.
103. GAVRILENKO, N.M.	Synoptic conditions for snow storms in the territory of the Ukrainian SSR. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #5, 1956.
104. GELMGOLTS, N.F.	Atmospheric fronts and precipitation over the plain region of Kazakhstan. J. Acad. Sci. Kazakh SSR, #5, 1954.
105. GELMGOLTS, N.F.	The aerological analysis of droughts in the western Kazakhstan. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #5, 1955.
106. GELMGOLTS, N.F.	The aerological analyses of droughts in the western Kazakhstan. Pap. Hydromet. Sci.-Res. Inst. Kazakhstan, #5, 1955.
107. GOGOLEVA, E.I.	Diagnosis and prognosis of low clouds. Methodical instructions #18, 1952.
108. GRICHENKO, M.V.	The effect of precipitation on forest fire hazard. Met. & Hydr., #3, 1954.
109. GUBIN, V.I.	On the qualitative prognosis of the wind variations at the earth's surface. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
110. DIUBIUK, A.F.	Vertical velocities in the region of quasi-stationary fronts. Pap. CFI., #45 (72), 1956.

111.	DIUBIUK, A.F. and MONIN, A.S.	A contribution to the forecasting of soil temperatures below the snow-cover. Pap. CFI, #21 (48), 1950.
112.	ZAVARINA, M.V.	Results of the operational application of synoptic methods for the forecasting of night-frosts. Pap. MGO, #55 (117), 1955.
113.	ZAK, E.G. and MARFENKO, O.V.	Structure of the lower part of a cloud cover. Pap. CAO, #7, 1952.
114.	ZVEREV, N.I.	On the forecasting of temperature. Met. & Hydr., #2, 1955.
115.	ZUBIAN, G.D.	Some peculiarities of cloud systems at quasy stationary fronts. Met. & Hydr., #2. 1953.
116.	ZUBIAN, G.D.	Variation of the pressure field with height in the neighbourhood of a front. Met. & Hydr., #3, 1954.
117.	IMIANTOV, I.M. and CHUVAEV, A.P.	On the conditions for lateral development of heavy thunderclouds. Met. & Hydr., #2, 1956.
118.	KACHURIN, L.G.	The development of precipitation in clouds with weak vertical velocity. Geophys. J. Acad. Sci. USSR, #2, 1956.
119.	KASHIN, K.I.	The distribution of wind in space, and precipitation. Journal of Information, #1, 1951.
120.	KASHIN, K.I.	On fire hazard in the forests. Met. & Hydr., #1, 1951.
121.	KOSHELENKO, I.V.	On the forecasting of radiation fogs. Met. & Hydr., #3, 1956.
122.	KOSHELENKO, I.V.	On the role of advection in the development of fogs. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #5, 1956.
123.	KUKHTO, A.P.	On the departure of the actual wind from the glostrophic wind. Met. & Hydr., #2, 1956.
124.	LEBEDEVA, N.V.	A model of convection and of forecasting the amount of shower-precipitation. Pap. CFI, #31 (58), 1954.
125.	LEBEDEVA, N.V.	Convection at fronts and in cyclonic regions. Pap. CFI, #38 (65), 1955.
126.	LEBEDEVA, N.V.	On the role of dynamic turbulence in the development of convection. Met. & Hydr., #2, 1955.
127.	LEBEDEVA, N.V.	Vertical motions at a front. Pap. CFI., #45 (72) 1956.
128.	LUGCHENKO, A.K.	Variations of the height of the base of air mass clouds at night. Pap. V.G.M.F. SA, #8, 1953.

129. MAZURIN, N.I. and NOVIKOV, B.M. Some peculiarities of coldfront cloud systems. Pap. V.G.M.F. SA, #11, 1955.

130. MATVEEV, L.T. Vertical motion in the boundary layer and its relation to the height of the base and top of cloud cover. Pap. V.G.M.F. SA, #11, 1955.

131. MININA, L.S. Variations in the moisture of an air mass under the influence of surface effects. Met. & Hydr., #5, 1955.

132. MUCHNIK, V.M. On the forecasting of thunderstorms. Met. & Hydr., #3, 1956.

133. NIKANOROV, G.T. and CHUVAEV, A.P. On the role of blocking layers (temperature inversions. Translator) in the production of precipitation. Met. & Hydr., #4, 1956.

134. ORLOVA, E.M. On the determination of changes in the stratification of air. Pap. CFI., #25 (52), 1951.

135. ORLOVA, E.M. On the role of a front in the development of showers. Pap. CFI, #38 (65), 1955.

136. POPOVA, T.P. On the phase-problem of precipitation. Met. & Hydr., #5, 1955.

137. PRIKHOTKO, G.F. Factors responsible for the development of radiation fogs. Met. & Hydr., #11, 1952.

138. PRIKHOTKO, G.F. Stratification of the atmosphere in the case of fogs. Met. & Hydr., #7, 1953.

139. PRIKHOTKO, G.F. On the vertical motions of the air in fogs. Met. & Hydr., #3, 1953.

140. RESHETOV, V.D. Explanation of the diurnal variation of wind in the atmosphere. Met. & Hydr., #5, 1955.

141. RESHCHIKOVA, A.A. and TONKOVA, Z.V. On the relationship between the base of cloud and the visibility. Pap. CAO, #7, 1952.

142. SADOVNIKOV, A.V. On the determination of the effect of temperature advection on stratification of the atmosphere. Pap. V.G.M.F. SA, #8, 1953.

143. SLOBODOV, B.A. On the determination of geopotential heights of instability energy and the reserves of circulation energy. Met. & Hydr., #1, 1956.

144. TIMOFEEV, M.P. On the theory of advection fogs. Geophys. J. Acad. Sci. USSR, #6, 1955.

145. TURKETTI, Z.L. On the methodics of precipitation studies. Met. & Hydr., #1, 1951.

146. CHESTNAIA, I.I. On the variation of height of the base of stratus clouds. Pap. MGO, #54 (116), 1955.

147. CHERKASSKAIA, V.M. Peculiarities in the development and growth of air mass convective precipitation in different synoptic situations. Pap. CFI, #31 (58), 1954.

148. SHISHKIN, N.S. On the conditions for development of convection in the atmosphere. Pap. MGO, #47 (109), 1954.

149. SHISHKIN, N.S. The application of slice-method for forecasting the vertical extent of convective clouds. Pap. MGO, #54 (116), 1955.

150. IAKOVLEVA, N.I. Analysis of nocturnal cooling and the forecasting of the ground frosts. Met. & Hydr., #3, 1954.

151. BLIUMINA, L.I. Analysis of recurrence of some ultra-polar processes (ultra-polar process in Russian terminology means cold air outbreaks from northern Siberia Westward and southwestward. Translator). Met. & Hydr., #1, 1954.

152. BORISOVA, L.G. Phases of the atmospheric large scale processes. Pap. CFI., #36 (63), 1954.

153. BIALYNITSKAIA, V.G. and PED, D.A. On the forecasting of cloudiness for natural synoptic periods. Met. & Hydr., #2, 1955.

154. GERGEL, O.N. and PED, D.A. On the displacement of components of the upper deformation field for natural synoptic periods. Pap. CFI, #36 (63), 1954.

155. KATS, A.L. On the determination of boundaries of the natural synoptic periods. Met. & Hydr., #10, 1953.

156. KURGANSKAIA, V.M. Synoptic conditions for strong cooling in eastern regions of the northern Caucasus. Pap. CFI, #36 (63), 1954.

157. PAGAVA, S.T. Contiguous analogical natural synoptic periods. Met. & Hydr., #4, 1951.

158. PAGAVA, S.T. Recurrence of some synoptic processes. Met. & Hydr., #6, 1951.

159. PAGAVA, S.T. On the natural synoptic region. Met. & Hydr., #10, 1953.

160. PAGAVA, S.T. On the principles of a synoptic method of long range forecasting. Met. & Hydr., #3, 1953.

161. PAGAVA, S.T. On the possibility of composing three day weather forecasts by days. Met. & Hydr., #3, 1953.

162. PAGAVA, S.T. The natural synoptic region, Pap. CFI, 36 (63), 1954.

163. PED, A.D. and BLINNIKOVA, Z.G. On the determination of components of the upper deformation fields of natural synoptic periods. Met. & Hydr., #10, 1953.

164.	KHRABOV, IU.B.	Results of forecasting the natural synoptic periods of early-fall ground frosts. Met. & Hydr., #2, 1951.
165.	KHRABOV, IU.B.	On forecasting for natural synoptic periods. Met. & Hydr., #6, 1955.
166.	SHISHIKOV, V.G.	On some improvements in the methodics of forecasting extreme warm and extreme cold autumn seasons. Pap. CFI., #36 (63), 1954.
167.	SHISHIKOV, V.G.	The role of some features of present natural synoptic periods for the forecasting of following natural synoptic periods. Met. & Hydr., #4, 1955.
168.	ASTAKHOVA, A.I. and SEMENOV, V.G.	On the stability of the distribution of water temperatures in the North-Atlantic. Met. & Hydr., #2, 1953.
169.	BELINSKII, N.A.	On the interaction of the atmosphere and ocean. Met. & Hydr., #8, 1953.
170.	VITELS, L.A.	The annual variation of large anomalies of precipitation. Met. & Hydr., #3, 1952.
171.	VITELS, L.A.	An equinoxial effect on the precipitation anomaly and its long term variations. Met. & Hydr., #6, 1952.
172.	GIRS, A.A.	On the problems of general circulation studies. Geog. J. Acad. Sci. USSR, #4, 1955.
173.	GIRS, A.A.	On the transformations of general circulation forms and their analysis. Met. & Hydr., #3, 1956.
174.	GIRS, A.A.	Peculiarities of the planetary frontal zone which are capable of causing the basic circulation types. Met. & Hydr., #4, 1953.
175.	DZERDZEEVSKII, B.L. and MONIN, A.S.	Standard models for the general circulation in the northern-hemisphere and the circulation index. Geophys. J. Acad. Sci., #6, 1954.
176.	KATS, A.L.	Quantitative characteristics of the horizontal components of the general circulation in the northern hemisphere. Met. & Hydr., #2, 1955.
177.	KATS, A.L.	On the study and estimation of the circulation. Met. & Hydr., #6, 1954.
178.	KURGANSKAIA, V.M.	The characteristics of drought periods from the view point of the general circulation. Geog. J. Acad. Sci. USSR, #2, 1953.
179.	POGOSIAN, KM.P.	Seasonal variation of planetary frontal zones. Met. & Hydr., #4, 1954.
180.	POGOSIAN, KM.P.	The intensity of the interlatitudinal exchange in different seasons. Met. & Hydr., #6, 1954.

181. SEMENOV, V.G. On the relationship between the intensity of the atmospheric circulation and the temperature of the earth's surface. Met. & Hydr., #1, 1952.

182. SEMENOV, V.G. The effect of the earth's surface on the development of macro-synoptic processes. Pap. CFI, #35 (62) 1954.

183. BAGROV, N.A. and MORSKOI, G.I. On the rating method of weather forecasts. Met. & Hydr., #4, 1955.

184. GAVRILENKO. Extremely warm and cold winters in the Ukraine and their effect on the freezing up of rivers. Pap. Hydromet. Sci.-Res. Inst. #6, 1956.

185. KARETNIKOVA, K.A. Temperature characteristics of the seasons in Mid-Asia according to the data of Tashkent observatory. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #12, 1953.

186. KURGANSKAIA, V.M. Synoptic conditions for strong cooling in eastern regions of the northern Caucasus. Pap. CRI., #36 (63), 1954.

187. MOROZOVA, M.I. Results of statistical-stochastical analysis of the anomalies of precipitation in Tashkent. Pap. Inst. Math.-Mech., Acad. Sci. Uzbek SSR, #12, 1953, Geophys. Series.

188. MORSKOI, G.I. On the application of extrapolation for the forecasting of the atmospheric circulation pattern. Pap. CFI, #34 (62), 1954.

189. NAZAROVA, V.L. On the effect of air masses of tropical origin on spring and summer precipitation in the Uzbekistan. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek, SSR, 1955.

190. OBUKHOV, A.M. On the rating of the success of alternative weather forecasts. Geophys. J. Acad. Sci. USSR, #4, 1955.

191. SARYMSAKOV, T.A. Chain processes and the problems of weather forecasting. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek, SSR, 1955.

192. SEMENOV, V.G. The application of mean thickness charts in long range forecasting. Met. & Hydr., #4, 1951.

193. SEMENOV, V.G. Meridional and latitudinal synoptic processes over Europe in Winter. Met. & Hydr., #8, 1953.

194. FOKINA, E.A. Types of monthly negative temperature anomaly in Tashkent. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek, SSR, 1955.

195. GEIGEROV, S.S.	Some results of aerological observations on the drifting station "North-Pole 4" during the summer of 1955, Met. & Hydr., #6, 1956.
196. GIRS, A.A.	Some peculiarities of synoptic processes in the Arctic and their relationship to the general circulation of the atmosphere. Pap. MGO, #56 (118), 1956.

III DYNAMIC METEOROLOGY

The review of basic research in dynamic meteorology (ending with 1953) is given in the textbook (1), which contains also a number of more recent results and methodical generalizations.

In recent years much attention has been given to the problems of the general circulation of the atmosphere and to the related problem of computing the mean distribution of temperature in the atmosphere. Improvements in and the application of theories of the general circulation, suggested by N.E. KOCHIN (2, 3) and E.H. BLINOVA (7), are reported in papers (5, 8, 15, 18, 45, 56-59, 81, 90-91). Application of the same ideas to the monsoon circulation is discussed in (60). The models of the atmospheric circulation are studied in (26). Papers (64, 65) analyze the annual variations of the speed of earth's rotation in conjunction with the atmospheric circulation.

Problems of the horizontal mixing, on a scale comparable with that of general circulation, are studied in (48, 49, 71).

Various aspects of the theory of the distribution of temperature in the atmosphere are discussed in (9, 42, 43, 46, 61, 66, 86, 87, 96). A joint computation of the distribution of temperature and the heat flow is carried out in (67).

Papers (29, 36, 54) widen the research scope of the effect of orographic factors on air moisture, the basic principles of which were laid down by N.E. KOCHIN and A.A. DORODNITSIN. Further development has also been made in the theory of convective motion in the atmosphere, in particular, that of seabreezes and mountain-valley winds (4, 12, 23-25, 98), etc.

A great number of studies have been devoted to the theory of air mass transformations and to its application. In the paper of SHVETS (93) it is shown that the method suggested by the author for the solution of parabolic type equations can successfully be applied to the problems of boundary layers and, in particular, to the problems of modification of air masses.

The monograph of M.E. BERLJAND (6), summarizes his year-long study of the theory of heat transformations in air, of the daily variation of meteorological elements, the application of these theoretical results to forecasting and of practical modification of the meteorological regime in surface layers of the air. The same problems are also discussed in papers (13, 19, 30, 35 and 89).

The effect of the non-geostrophic nature of the wind in the free atmosphere on the wind at the boundary layer of the atmosphere is discussed from different points of view in papers (50, 55, 70). A number of papers have been devoted to deriving methods for computation of the vertical velocities (52, 63), etc., in particular those in the boundary layer (40, 44, 47) and in the regions of fronts (28, 31, 41). The effect of vertical velocities on evaporation and condensation of water vapour in the atmosphere have been studied in papers (94, 95, 97) and others. Papers (76, 78-80, 88, 89) and others define more precisely the individual states in thermodynamics of the atmosphere.

The study and interpretation of I.A. KIBEL'S method of forecasting the pressure and temperature continued through the early fifties, (10, 37, 53, 72, 82). In 1949, A.M. OBUKHOV (62) applied the vorticity equation to the analysis of non-stationary atmospheric processes. From 1952 on, the vorticity equation has been used in conjunction with the equation for heat flow as a basic tool in forecast studies by the methods of dynamic meteorology. In studies along these lines (16, 51, 73, 77, 102), different factors influencing the variations of pressure in the mid-troposphere, among them the effects of orography and fronts, are studied. A method for computing the local pressure variations from the initial windfield is derived in papers (17, 84, 85). In papers (20, 32, 75) some new aspects of the departures of the actual wind from the geostrophic wind are discussed. In paper (38), a quite comprehensive treatment of laws governing the non-stationary processes is given and in (62) a suggested idea of adapting the pressurefield to the windfield is materialized. Paper (99) suggests transformation of coordinate for greater accuracy in the equations used in numerical prediction of the pressure pattern.

The structure of meteorological fields in regions of large scale motions and the characteristic values of space and time derivatives are studied in papers (11, 74, 90, 100, 101).

Paper (101) investigates the loss of precision of equations in atmospheric dynamics (the equations of vorticity and divergence included) resulting from different simplifying assumptions; whereas paper (90) studies this problem from the viewpoint of the empirical "functions of influence" for utilizing them in numerical prediction.

Individual problems in atmospheric dynamics have been treated in papers (21, 22, 27, 33, 39, 68, 69) and in others. Many papers having dynamic as well as synoptic importance have been listed under "synoptic meteorology".

LITERATURE

1. GANDIN, L.S., LAIKHTMAN, D.L., MATVEEV, L.T. and IUDIN, M.I. Basic principles of dynamic meteorology. Hydromet. Publ. House, 1955.
2. KOCHIN, N.E. On simplification of the equations of hydromechanics for the general circulation of the atmosphere, 1935. Collected Volume I, Publication of Acad. Sci. USSR, 1949.
3. KOCHIN, N.E. Construction of a model of zonal circulation for the atmosphere, 1936. Collected Vol. I. Publication of Acad. Sci. USSR, 1949.
4. BAEV, V.K. Free convection in the atmosphere. CFI, 1953.
5. BERLJAND, O.S. The distribution of atmospheric pressure at the earth's surface in the case of a stationary zonal circulation of the atmosphere. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 14, #3, 1950.
6. BERLIAND, M.E. Forecasting and regulating the heat regime of the surface layer of the atmosphere. Hydromet. Publ. House, 1956.
7. BLINOVA, E.N. Hydrodynamic theory of pressure waves and centres of actions in the atmosphere. Reports Acad. Sci. USSR, Vol. 39, #7, 1943.
8. BLINOVA, E.N. On the determination of sea-level pressure. Reports Acad. Sci. USSR, Vol. 92, #3, 1953.
9. BLINOVA, E.N. On the mean annual distribution of temperature in the earth's atmosphere resulting from the distribution of the continents and oceans. Geog. and Geophys. J. Acad. Sci. USSR, Vol. II, #1, 1947.
10. BUGAEV, V.A. Laws governing the qualitative hydro-dynamical forecast of pressure variations, Tashkent, 1951.
11. BUGAEV, V.A. On the order of magnitude of the horizontal derivatives in the pressure and temperature fields of the atmosphere. Geophys. J. Acad. Sci. USSR, #4, 1952.
12. BURMAN, E.A. On the distribution of vertical velocities in the sea-breeze circulation. Pap. OGMI, #5, 1953.
13. BURMAN, E.A. The results of computations forecasting daily variations of air temperature in the coastal zone. Met. & Hydr., #11, 1952.
14. BYZOVA, N.L. A contribution to the theory of self-generated oscillations in heat convection. Pap. Inst. of Marine Hydro-physics Acad. Sci. USSR, Vol. 6, 1955.

15.	BYKOV, V.V. and MASHKOVICH, S.A.	On the characteristics of the zonal circulation of the atmosphere. Met. & Hydr., #2, 1956.
16.	BYKOV, V.V.	The effect of mountains on the variation of pressure in the mid-troposphere. Met. & Hydr., #4, 1955.
17.	VASENKOV, K.A.	Analysis of local pressure variations in the case of cyclogenesis in the troposphere. Pap. CFI, 45 (72) 1956.
18.	VULFSON, N.I.	The calculation of a non-zonal case of stationary circulation of the atmosphere. Geophys. J. Acad. Sci. USSR, #2, 1951.
19.	GANDIN, L.S. and SOLOVEICHIK, R.E.	On the daily variation of temperature in the presence of advection. Pap. MGO, #60 (122), 1956.
20.	GUBIN, V.I.	The calculation of wind speed from the pressure field. Pap. Inst. Math.-Mech. Acad. Sci. Uzbek SSR, #14, 1955.
21.	GUBIN, V.I.	A contribution to the calculation of solenoids in the friction layer. Pap. Geophys. Obs. of Tashkent, #5, 1951.
22.	GUBIN, V.I.	Frontogenesis and the variation of pressure. Reports Acad. Sci. of Uzbek SSR, #12, 1955.
23.	GUTMAN, L.N. and MONIN, A.S.	On the local winds in a mountainous locality. Pap. CFI, #21 (48), 1951.
24.	GUTMAN, L.N. and MONIN, A.S.	On thermal pertubations in the horizontal flow of air. "Applied Maths. and Mech.", #3, 1950.
25.	GUTMAN, L.N. and MONIN, A.S.	The "slope winds" over gently sloping surfaces. Geophys. J. Acad. Sci. USSR, #4, 1953.
26.	DMITRIEV, A.A.	On the derivation of models of geophysical circulation in a rotating parobolic container. Geophys. J. Acad. Sci. USSR, #3, 1956.
27.	DMITRIEV, A.A.	Some problems in the dynamics of cyclones considered as vortical pivots in a non-uniform layer. Pap. Inst. Marine Hydrophysics Acad. Sci. USSR, Vol. 6, 1955.
28.	DOGADKINA, N.P. and DIUBIUK, A.F.	Vertical velocities in the vicinity of a stationary front. Pap. CFI, #45 (72), 1956.
29.	DORODNITSYN, A.A.	The effect of the relief configuration of the earth's surface on air currents. Pap. CFI., #21, 1950.
30.	DIUBIUK, A.F.	The variation of humidity over a water surface. Pap. CFI., 26 (53), 1951.
31.	DIUBIUK, A.F.	On the vertical velocities generated by friction forces in the neighbourhood of a front. Pap. CFI., #26 (53) 1951.

32. DIUBIUK, A.F. On the determination of the instantaneous rate of variation in meteorological elements. Pap. CFI, #26, 1951.

33. DIUBIUK, A.F. Abnormal rates of movement of pressure systems. Pap. CFI, #26 (53), 1951.

34. KACHURIN, L.G. The development of precipitation in clouds having weak vertical currents. Geophys. J. Acad. Sci. USSR, 1956, #2.

35. KLIUCHNIKOVA, L.A. On the development of advection fogs. Pap. MGO, #60 (122), 1956.

36. KIBEL, I.A. The three-dimensional problem of the flow of air over irregular surface of the earth. Reports Acad. Sci. USSR, Vol. 100, #2, 1955.

37. KIBEL, I.A. Application of the equations of hydromechanics to a baroclinic fluid in meteorology. Geog. and Geophys. J. Acad. Sci. USSR, #5, 1940.

38. KIBEL, I.A. On the adaption of air motion to the geostrophic low. Report. Acad. Sci. USSR, Vol. 104, #1, 1955.

39. KHOGAN, S.IA. On a method of computing the advective influx of heat. Pap. Inst. Geophys. Acad. Sci. USSR, #37 (164), 1956.

40. LAIKHTMAN, D.L. The estimation of the vertical component of wind in the surface layer. Collected vol. of Pap. of Hydromet. Inst. of Leningrad, #3, 1954.

41. LEBEDEVA, N.V. Vertical motions at a front. Pap. CFI., 45 (72), 1956.

42. MALKEVICH, M.S. On the vertical distribution of temperature in the atmosphere. Geophys. J. Acad. Sci. USSR, #2, 1955.

43. MALKEVICH, M.S. A theoretical method for the determination of temperature lapse rate in the atmosphere. Geophys. J. Acad. Sci. USSR, #5, 1956.

44. MATVEEV, L.T. Vertical currents in the boundary layer of the atmosphere. Geophys. J. Acad. Sci. USSR, #5, 1955.

45. MASHKOVICH, S.A. On the seasonal oscillations of jet streams. Met. & Hydr., #6, 1956.

46. MASHKOVICH, S.A. The distribution of temperature along the vertical at different latitudes of the northern and southern hemispheres. Pap. CFI, #21 (48), 1950.

47. MERTSALOV, A.N. The determination of vertical velocities in the friction layer for a surface pressure field having circular isobars. Met. & Hydr., #11, 1951.

48. MONIN, A.S.	Horizontal mixing in the atmosphere. Geophys. J. Acad. Sci. USSR, #3, 1956.
49. MONIN, A.S.	On the large scale exchange in the earth's atmosphere. Geophys. J. Acad. Sci. USSR, #4, 1956.
50. MONIN, A.S.	A stationary model for the distribution of wind with height in the case of circular isobars. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 13, 1949.
51. MONIN, A.S.	The variations of pressure in a barotropic atmosphere. Geophys. J. Acad. Sci. USSR, #4, 1952.
52. MORSKOI, G.I.	A contribution to the computation of vertical velocities. Met. & Hydr., #1, 1954.
53. MORSKOI, G.I.	The theoretical model of I.A. KIBEL for short range forecasting of pressure and temperature. Met. & Hydr., #2, 1951.
54. MUSAELIAN, SH.A.	The three-dimensional problem of airflow over irregular surface of the earth, considering the spherical form of the earth. Reports. Acad. Sci. USSR, Vol. 103, #5, 1955.
55. MUKHINA, T.S.	The effect of time-variations of pressure gradient on the wind in the surface layer. Pap. CFI, #26 (53), 1951.
56. MKHITARIAN, A.M.	The consideration of surface friction in the problem of sea level pressure distribution. Geophys. J. Acad. Sci. USSR, #1, 1955.
57. MKHITARIAN, A.M.	The consideration of vertical turbulent exchange in the distribution of pressure at sea level. Reports Acad. Sci. Armenian SSR, Vol. 21, #1, 1955.
58. MKHITARIAN, A.M.	On the distribution of atmospheric pressure at the earth's surface. Reports Acad. Sci. Armenian SSR, Vol. 21, #3, 1955.
59. MKHITARIAN, A.M.	On the distribution of atmospheric pressure at the earth's surface. Geophys. J. Acad. Sci. USSR, #7, 1956.
60. MKHITARIAN, A.M.	The monsoon circulation as a non-stationary problem. Reports Acad. Sci. of Armenian SSR, Vol. 19, #2, 1954.
61. MKHITARIAN, A.M.	On the applications of the theory of large scale convection. Reports Acad. Sci. Armenian SSR, Vol. 20, #3, 1955.
62. OBUKHOV, A.M.	On the geostrophic wind. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 13, #4, 1949.

63. ORLOVA, E.M.	On the calculation of vertical velocities from the windfield. Met. & Hydr., #1, 1955.
64. PARIISKII, N.N.	The variations in speed of the earth's rotation during a year. Pap. Inst. Geophys. Acad. Sci. USSR, #19 (146), 1953.
65. PARIISKII, N.N. and BERLJAND, O.S.	The effect of seasonal variations in the atmospheric circulation on the rate of rotation of the earth. Pap. Inst. Geophys. Acad. Sci. USSR, #19 (146), 1953.
66. RAKIPOVA, L.R.	On the mean annual zonal distribution of temperature in the earth's atmosphere. Pap. MGO, #33 (95), 1952.
67. RAKIPOVA, L.R.	The mean annual zonal temperature of the earth's atmosphere and factors which determine it. Pap. MGO, 41 (103), 1953.
68. RAKIPOVA, L.R.	Vertical motion in the atmosphere and cosmic dust. Pap. MGO, #19, 1950.
69. RAKIPOVA, L.R.	On the mechanism linking the troposphere with the upper layers of the atmosphere. Pap. MGO, #28, 1951.
70. RAZUMOVSKAIA, L.F.	Peculiarities caused by friction in the change of wind with height in different parts of a cyclone. Pap. CFI, #26 (53), 1951.
71. RESHETNIKOVA, K.A.	A contribution to the problem of the coefficient of horizontal exchange. Pap. MGO, #55, 1955.
72. ROMOV, A.I.	A contribution to the analysis of the wind departures from the geostrophic in the free atmosphere. Met. & Hydr., #1, 1951.
73. ROMOV, A.I.	On the variation of vorticity and the rate of circulation in the atmosphere. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #4, 1955.
74. RUZIN, M.I.	Some problems in the kinematics of air currents. Pap. State Univ. of Leningrad, #5, 1954.
75. RUPPERT, L.L.	A contribution to the problem of the geostrophic wind. Pap. VGMF SA, #5, 1952.
76. SADOVNIKOV, A.V.	The relationship between the relative humidity and the dew point. Pap. VGMF SA, #5, 1952.
77. SADOKOV, V.P.	A contribution to the role of fronts in the calculation of pressure variations for the mid-troposphere. Met. & Hydr., #7, 1956.
78. SLAVIN, I.A.	A general expression for the entropy of moist air. Pap. VGMF SA, #5, 1952.

79. SLAVIN, I.A. On the thermodynamic treatment of wet bulb temperature. Pap. VGMF SA, #5, 1952.

80. SLAVIN, I.A. The analysis of meteorological temperatures from the view point of the second law of thermodynamics. Pap. VGMF SA, #12, 1955.

81. SLOBODOV, B.IA. A contribution to the calculation of turbulent exchange in the problem of the distribution of pressure and wind in the atmosphere. Geophys. J. Acad. Sci. USSR, #8, 1956.

82. TITOV, S.I. Physical explanation of some concepts in the KIBEL theory. Pap. VGMF SA, #5, 1952.

83. TKACHENKO, A.V. On the mean temperature of a vertical column of air. Sci. Pap. Agricultural Inst. of LVOV, Vol. 3, 1952.

84. USPENSKII, B.D. Theory of local changes in the geopotential height of isobaric surfaces. Met. & Hydr., #5, 1954.

85. USPENSKII, B.D. Theory of the local changes of surface pressure. Met. & Hydr., #1, 1955.

86. FEIGELSON, E.M. The vertical distribution of temperature in the earth's atmosphere due to radiation and vertical turbulent exchange of heat. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 14, #4, 1950.

87. FEIGELSON, E.M. The effect of clouds on the heat regime of the atmosphere. Pap. Inst. Geophys. Acad. Sci. USSR, #37 (164), 1956.

88. KHRGIAN, A.KH. On atmospheric processes departing slightly from adiabatic. Pap. CAO, #6, 1952.

89. TSEITIN, G.KH. A contribution to the problem of calculating horizontal diffusion in air mass modification. Pap. MGO, #60 (120), 1956.

90. CHAPLYGINA, A.S. The 24 hour changes in the thermal-isobaric field of the free atmosphere. Pap. Inst. Geophys. Acad. Sci. USSR, #33 (160), 1956.

91. SHVETS, M.E. On the peculiarities of atmospheric motions in the equatorial region. Pap. MGO, #33 (95), 1952.

92. SHVETS, M.E. A contribution to the hydrodynamic theory of the zonal circulation of the atmosphere. Pap. MGO, #41 (103) 1953.

93. SHVETS, M.E. On approximate methods of solution of some problems of geophysics and aero-hydro-mechanics. Pap. MGO, #19 (81), 1950.

94. SHVETS, M.E. A contribution to the problem of moisture circulation in the atmosphere. Geophys. J. Acad. Sci. USSR, #6, 1955.

95. SHVETS, M.E. On the condensation of water vapour in the atmosphere. Geophys. J. Acad. Sci. USSR, #6, 1955.

96. SHEKHTER, F.N. The vertical distribution of mean temperature in a selectively absorbing atmosphere. Pap. MGO, #37 (99), 1952.

97. SHISHKIN, N.S. Clouds, precipitation and thunderstorm electricity. Moscow, 1954.

98. GUTMAN, M.N. A contribution to the theory of mountain-valley winds. Reports Acad. Sci. USSR, Vol. 66, #2, 1949.

99. IUDIN, M.I. Invariant quantities of large scale atmospheric processes. Pap. MGO, #55, 1955.

100. IUDIN, M.I. Some problems in the theory of meteorological fields. Pap. MGO, #19 (81), 1950.

101. IUDIN, M.I. The application of the statistical theory of turbulence to simplify equations of atmospheric dynamics. Pap. MGO, #33 (95), 1952.

102. IAGLOM, A.M. The dynamics of large scale processes in a barotropic atmosphere. Geophys. J. Acad. Sci. USSR, #4, 1953.

IV ATMOSPHERIC OPTICS AND ACTINOMETRY

The present chapter briefly reports on the most important research results in atmospheric optics and actinometry obtained in the USSR from 1950 up to the present. The report limits itself to the discussion of purely optical problems leaving aside some of their applications (for example in heat balance, etc.).

Optical properties of the elements of the Atmosphere. Molecules

Absorption of radiation by water vapour in the neighbourhood of the infrared spectral band has been studied experimentally. Considerable departures from the Bouguer-Beer's law in the region of partial pressures 10 - 100 mb (1) have been established. In conjunction with the non-fulfilment of the Bouguer-Beer's law in the atmosphere a method for calculation of the absorption of radiation by molecules of H_2O and CO_2 has been derived from experimentally established transmission functions (2, 5). Also studied was the reverse problem of the determination of water vapour content by spectroscopical method (3).

Particles of Aerosol and Clouds

Studies of the theory of scattering of light by small particles in the atmosphere had the following main objectives: the elimination of various uncertainties in the theory of scattering, the development of approximate methods for calculating scattering by large spherical and non-spherical particles and the tabulation of accurate equations. A general review of results obtained and a systematic discussion of the problem can be found in (9), a more detailed analysis of particular items in (7, 8, 10-14). From the specific results obtained we should point out the clarification of the paradoxical doubling of the coefficient of extinction for the larger particles, the explanation lies in the peculiarities of diffraction in scattering at a particle. Interesting resonance phenomena in the scattering of light by small particles were discovered (9). Detailed calculation of the coefficients of scatter and polarization of light in the visual range by the largest of waterdroplets which occur in the atmosphere was accomplished in (7). This was later extended to the ultraviolet and infrared spectral ranges (20). The departure of accurate diffraction equations from the equations of geometrical optics was studied theoretically (10) and the coefficient of scatter by a cloud droplet was computed (9). The scattering of light on large transparent droplets of spherical and arbitrary form was studied experimentally in (4). It was found that the coefficients of non-spherical particles are more uniform than those of spherical particles . The peculiarities of the heat radiation of small particles have been studied theoretically (9), also those of waterdroplets in conjunction with the effect of radiation fogs on the radiation balance of the earth's surface (13). In (8), an approximate method is derived for the scattering of light involving only simple equations, even for non-spherical (ellipsoidal) particles.

The conditions in which the scattering of light by individual particles in a volume can be considered as incoherent are studied in (12). A model for the scattering of light by arbitrary two layer particles has been derived (15) and a detailed computation of radiation properties of cloud droplets in the infrared spectral range (up to $\gamma < 117\mu$) have been carried out (16). The effective cross-section of small particles for the scattering below 90° angle is studies in (17). The reverse problem - the utilization of experimentally obtained coefficients of scattering for determination of the distribution curve of sizes of aerosol particles is also accomplished. This problem is closely related to the conditions at which the so called "coronae" can be observed (18, 19).

Theory of radiation transfer in a cloudless atmosphere

The studies of the theory of radiation transfer have been pursued along the following lines:

To apply the radiative heat transfer to problems of thermodynamics and dynamic meteorology;

To apply the scattering of shortwave radiation of a cloudless atmosphere to the problems of atmospheric optics, visibility, and aerial photography.

The review on these results is given in (26, 27) also one in connection with the thermal regime of the surface layer in (21). The most important of these results will be surveyed in the following.

The Transfer of Black Body Radiation

The distribution of solar infrared radiation in the atmosphere and the influx of heat due to its absorption is computed in (32) and (35). The radiation equilibrium of the gas envelope surrounding an absolutely black sphere is calculated in (30). New treatments of and models for spectral absorption by basic absorbing substances are reported in (27). Methods for computing the selective absorption in the problems of heat exchange have been worked out in (27, 51). The vertical distribution of temperature resulting from integration of all forms of heat exchange has been accomplished. The vertical distribution of temperature resulting from schematically considered selective absorption is studied in (33, 34, 48).

The Scattering of Shortwave Radiation

Great effort has been made for the development of mathematical solutions for the equations of transfer (24, 25, 31, 47). Calculations have been performed on the intensity of scattered light in the atmosphere and for the different coefficients of turbidity resulting from the scattering of light at spherical and non-spherical aerosol particles (28, 29, 46). Exact methods have been developed for the computation of flux of black body radiation in a medium (23, 43). In (17), an exact method is given for the determination of the distribution of light inside an absorbing medium; in (42, 44, 45) statistical methods have been developed for the solution of problems related to the scattering of light. Methods have been derived for the approximate calculation of multiple scattering from the brightness of the daytime sky in order to free the results from the scattering of higher orders (23, 38, 39, 40, 43, 49, 50). In these papers (40, 49, 50) account is taken of the spherical form of the earth. The studies of the diffusion of light in the atmosphere, taking into account the polarization of light (41), and those on the mathematical basis of the theory of radiative heat transfer (22) should be mentioned.

The transparency, brightness and polarization in a cloudless atmosphere

The laws governing the flux of solar radiation at the earth's surface have been studied experimentally and theoretically in (52, 60, 64, 73). Some results have also been obtained on the daily variation of spectral coefficients of the transparency of the atmosphere (65).

The pyranometric investigations of the absorption of global radiation by different layers of the atmosphere, carried out on board of airplanes and by free balloons, are reported and discussed in (54, 57, 62, 63, 74, 75). According to these results the measured global radiation is 1 1/2 times larger than that computed by the known equation of MÜLLER.

Papers (56, 59, 78) study the distribution of energetic and visual brightness over the sky. Papers (66-72) deal with the studies of the coefficient of scattering for the whole atmosphere and develop a simple method for its calculation from the brightness of the sky. The optical properties of the atmosphere in mountains have been studied in (73). A good agreement has been established between the measured and theoretically computed results of the effective radiation at the earth's surface and, particularly, the advantages of a new radiation nomogram have been pointed out in (58, 76). Measurements by free balloons up to 8 km have confirmed that the effective density of water vapour is proportional to the square root of pressure (77). Studies of the distribution of back radiation over the clear sky enabled us to determine experimentally the coefficient of diffusion which amounted to 1.68 ± 0.05, and the integral function of the absorption (55). Longwave radiation from the ground was successfully utilized for the experimental determination of the mean temperature of the earth's surface (53, 61).

Optics of Clouds and Fogs

A general analysis of the problem is given in the book (92). Studies on the transfer of longwave radiation in clouds and fogs were organized along the following lines:

The main emphasis was laid on the study of microphysical processes involved in the absorption and scattering of radiant energy by liquid water droplets. The results obtained have been utilized in (92-96) for the development of a model for radiation processes in clouds, being based on an approximate solution of the equations of SCHWARZSCHILD.

Investigations, based on the solution of accurate equations of longwave radiative transfer under simplifying assumptions in respect of scattering and absorbing properties of the clouds are reported in (85, 87-90). Interesting results have been obtained in experimental studies of multiple scattering in a turbid medium (86).

Measurements of the transparency of clouds in mountain conditions (Elbrus) has yielded results which are in satisfactory agreement with theory. Success was achieved in developing an optical method which enables one to investigate separately the liquid and gaseous phase in a cloud (82). Direct measurements of the longwave radiation flux in a cloud by an aircraft have given results which are in fair agreement with those obtained from theoretical considerations (84). A detailed investigation of reflection, transparency and absorption of solar radiation by clouds of different form is reported in (91).

Reflecting Properties of Natural Surfaces

Investigations in this subject have been conducted for surface conditions as well as at higher elevations on board an aircraft. For a general review of this problem see (109, 111).

Measurements at the earth's surface. The laws governing the spectral and angular variations of albedo over different soils, plant cover, snow and ice have been studied in (93-95, 97-102, 106, 112, 113, 115, 118, 120). As a rule, the albedo decreases with increasing elevation of the sun, as a result of both the variations in the angle of incidence of the sun rays and in the spectral composition of sunlight (105, 108, 112). Albedo of water bodies depends on the turbidity of the water and on the state of agitation of the water surface (26, 107, 110, 118). New and more up to date calculations of albedo for the earth have been carried out; it is established that the meteorological method of determination of the albedo of the whole globe coincides with the photometrical method (96, 103, 117). A considerable anisotrophy of reflected light from the earth's surface is established in (101). In the infrared part of the solar spectrum, the albedo of a number of natural surfaces had an order of magnitude of about 30 - 40% (121). The properties of spectral reflecting of an albedo unit meter - Barium covered paper - has been investigated in (102).

Measurements in the air The albedo of some surfaces has been determined from an airplane (99, 113), and from free-balloons (116). It is established that sometimes the albedo increases with height, sometimes decreases (119). The dependence of pyranometer readings on pressure (i.e. on the height of flight) is studied in (104).

Actinometry. Instruments and Methods of Measurement

Beside the theoretical investigations in actinometry, the practical side of the problem: the methodics and techniques of measurement - , have been the subject of many papers. Whereas in prewar years the actinometric measurements program at a few observatories consisted of atmospheric transparency and global radiation as the macroclimatic radiation characteristics, in recent years actinometric measurements have been introduced, in selected places, into the meteorological network and the observation times have been made to coincide with those of climatology (15).

The main emphasis in the observation program is now laid on the measurement of components of the radiation balance of global as well as of shortwave (0.3-4μ) radiation by actinometers, pyranometers and balance meters. Individual investigations in the neighbourhood of stations have been carried out for the determination of the radiation regimes of prevailing surface types in the vicinity of stations. Albedo of the earth is measured with pyranometers facing the earth's surface. The time intervals between the direct observations is 3 hr. during daytime and 6 hr. at night.

Older actinometric stations were equipped with separate sensitive recorders for the recording of global and sky radiation, to which in some stations was added also a radiation balance recorder. The newer stations are equipped, as a rule, with one three-component recorder for recording these elements. Also photo recorders, electronic and mechanical recorders are in use at individual stations. New mechanical galvanographs are in construction for stations not having alternating current. In the construction stage are also automatically integrating recorders.

The actinometric network of the USSR employs Savinov type thermoelectric actinometers having an increased sensitivity and a 10° aperture angle, which is twice as large as that of the receiving element. The same aperture angle is used in balance meters and sky radiation pyranometers. The sensitivity of the actinometer is about 7 mv. per 1 cal/cm^2 min. with an internal resistance of 15 ohms. Inertia lag of the instrument is about 20 seconds.

The square thermopiles of pyranometers under glass domes have a sensitivity 8-11 mv. and a 30 second time lag. The dependence of the sensitivity of each instrument on the incidence angle (being mainly a result of employing domes) is known and is taken account of in working up the recordings.

At present, the selectivity of parameters and the effect of this on the measurement of scattered radiation is being investigated.

Balance meters with large heat conduction through their bodies and with 340 thermocouples of constantan silver, have at 60 ohm resistance a sensitivity of 7 mv. which decreases by 2-2.7% per 1m/sec. increase of wind speed. The latter is determined by wind meter. Artificial ventilation of balance meter in calm conditions has not, so far, been practiced. However, the effect of wind on the readings of the balance meter is now under investigation. The selectivity of the instrument has been investigated. A new type of Savinov gyrgeometer has been employed at some stations recently.

All these four instruments are successively connected to a single pointer-type galvanometer enclosed in a high gloss white case on a tripod which permits its use in field studies of the radiation. In recent times, improvement of pyranometers and balance meters and adaption of their parameters to galvanometers have been commenced. A project is under way to introduce into the service radially symmetrical pyranometers which have a standard sensitivity of 5.7

ohms, a resistance of 19 ohms, a smaller error on account of the battery and a lag of 10 sec. The project also foresees the introduction of a low resistance balance meter with a brass-constantan thermopile having the above sensitivity and resistance.

A metal mounting base has been devised for instrument which permits of their rapid levelling off and which exposes always the same side of the insturment to the sun.

Simultaneously with the readings of pyranometer and balance meter, the actinometer is also read off on a separate galvanometer for the purpose of checking the determination of albedo and radiation balance in variable radiation conditions.

The thermoelectric actinometer or bimetalic actinometer of MIKHELSON serves in the capacity of control instrument, except at some stations using the pyrheliometer. Beside the Angstrom type pyrheliometer of Soviet make a modified version (by VOLOSHIN) is also used which has a circular aperture and a higher sensitivity of the thermopile.

Attention is also drawn to the bolometric pyrheliometers with circular aperture suggested by VIUSHKOV and SKALIAROV. The aperture angles of the latter are equal to those of the actinometers.

The network of stations measuring illumination has shrunk to 6 at the present time but will be expanded during the IGY. The recording instruments for ultra-violet radiation are in the testing stage at present.

The methodics of actinometric measurement have been published in "Procedures", 1947, which in some respects has already become out of date and has been supplanted by methodical circulars (151). A new manual for actionometric measurements is in the publishing stage at present.

Manuals for calibration describe the methods of calibration of instruments for the actinometer or pyrheliometer and for an artificial source of radiation. Contemporary radiation instruments have been described in the recent book by V.N. KEDROLIVANSKII.

Visibility In connection with research on the visibility of distant objects and lights, a detailed study on threshold of visibilities and on other related characteristics has been made in (122, 124, 127, 128, 129, 131, 143).

Many investigations have been devoted to improvement of the methods of measuring visibility. The Main Geophysical Observatory has constructed a new visibility instrument the "contrast meter" which is based on the extinction principle with increased brightness of the field of view (133-138). A uniform method for visual measurement of visibility by contrasts of distant objects has been worked out (123-125, 129-132, 140, 143). The visibility of real objects and lights in natural conditions has been investigated in (124-126, 129, 139-142, 144).

Atmospheric ozone The measurement of atmospheric ozone by its absorption of radiation in some ultra-violet spectral band has been studied both theoretically (145) and practically (149). Some results of ozone measurement are reported in (146-148) and in the monograph (150).

LITERATURE

1. BRONSHTEIN, A.M. The studies of absorption of radiation by water vapour at different densities and temperatures. Pap. MGO, #42 (104), 1953.

2. KUZNETSOV, E.S. Calculation of absorption coefficients of water vapour in the case of departures from BUGG's law. Pap. Inst. Geophys. Acad. Sci. USSR, #23 , 1954.

3. TOROPOVA, T.P. Determination of the amount of water vapour in the atmosphere by a spectral method. Reports Acad. Sci. USSR, Vol. 86, #1, 1952.

4. FEDOROVA, E.O. Investigations on the light scattering coefficient of large transparent particles of spherical and arbitrary form. Authors candidate thesis, Leningrad, 1952.

5. FEIGELSON, E.M. On the absorbing properties of water vapour and carbonic acid. Geophys. J. Acad. Sci. USSR, #1, 1955.

6. SHIFRIN, K.S. The coefficient of scattering of light by large particles. Geog. and Geophys. J. Acad. Sci. USSR, #1, 1950.

7. SHIFRIN, K.S. Scattering of light by large water droplets and the polarization of light in rainbows. Geog. and Geophys. J. Acad. Sci. USSR, #2, 1950.

8. SHIFRIN, K.S. A contribution to the theory of light scattering in the atmosphere. Pap. MGO, #19, 1950.

9. SHIFRIN, K.S. Scattering of light in a turbid medium. State Technical Publ. House, 1951.

10. SHIFRIN, K.S. Scattering of light by a possible large transparent particle. Pap. MGO, #26 (88), 1951.

11. SHIFRIN, K.S. Derivation of equations for the scattering of natural light from the equations of MEE (in Russian MI. Jr.) for the scattering of linearly polarized light. Pap. MGO, #26, 1951.

12. SHIFRIN, K.S. On the coherence of the scatter of light in transparent systems. Koll (? Translator) J. #2, 1951.

13. SHIFRIN, K.S. The effect of fog on the radiation balance. Pap. MGO, #27, 1951.

14. SHIFRIN, K.S. The relationship between extinction and scattering along the ray path. Pap. MGO, #26, 1951.

15. SHIFRIN, K.S. The scattering of light by two layer particles. Geophys. J. Acad. Sci. USSR, #2, 1952.

16. SHIFRIN, K.S. — A contribution to the theory of the radiation properties of clouds. Reports Acad. Sci. USSR, Vol. 94, 1954, Pap. MGO, #46, 1955.

17. SHIFRIN, K.S. — A contribution to the theory of optical methods for the study of colloidal systems. Pap. of All-Union Correspondence Inst. of Forestry, Leningrad, 1955, #1.

18. SHIFRIN, K.S. — Numerical solution of some types of finite integrals containing squares of Bessel's function of the first order. Pap. of All-Union Correspondence Inst. of Forestry, Leningrad, 1956, #2.

19. SHIFRIN, K.S. — The optical studies of cloud particles. Pap. MGO, 1956 (in publication).

20. SHIFRIN, K.S. and RABINOVICH, IU.I. — Spectral absorption coefficients of cloud and precipitation droplets. Pap. MGO, 1956 (in publication).

21. BERLJAND, M.E. — Forecasting and control of the heat regime of the surface layer of the atmosphere, Leningrad, 1956.

22. GUSEV, M.I. — A contribution to the verification of the elementary theory of radiation fields. Pap. MGO, #48, 1954.

23. GUTSHABASH, S.D. — The scattering of light in a medium having a variable coefficient of scattering. Sci. Pap. Univ. of Leningrad, Math. series, #25, (153), 1952.

24. KOGAN, S.IA. — On the method of spheric functions in atmospheric optics. Reports Acad. Sci. USSR, 1956.

25. KOGAN, S.IA. — On the application of spherical harmonics in the solution of the problem of light scattering in the atmosphere (in publication).

26. KONDRATEV, K.IA. — Radiant energy of the sun. Leningrad, 1955.

27. KONDRATEV, K.IA. — Radiant heat exchange in the atmosphere, Leningrad, 1956.

28. KUZNETSOV, E.S. — Theory of slanting visibility. Geophys. J. Acad. Sci., Vol. 7, #5, 1943.

29. KUZNETSOV, E.S. and OVCHINSKII, B.V. — The results of numerical solution of the integral equation for the scattering of light in the atmosphere. Pap. Inst. Geophys. of Acad. Sci. USSR, #4, 1949.

30. KUZNETSOV, E.S. — Radiation balance of the gas envelope surrounding an absolute black body. Geophys. J. Acad. Sci. USSR, #3, 1951.

31. KUZNETSOV, E.S. — A general method for the construction of approximate equations describing the flux of radiant energy. Geophys. J. ACAD. Sci. USSR, #4, 1951.

32. KUZNETSOV, E.S. On the absorption of solar radiation in the earth's atmosphere. Pap. Inst. Geophys. of Acad. Sci. USSR, #23. 1954.

33. MALKEVICH, M.S. On the vertical distribution of temperature in the atmosphere. Geophys. J. Acad. Sci. USSR, #2, 1955.

34. MALKEVICH, M.S. A theoretical method for the determination of the vertical temperature gradient in the atmosphere. Geophys. J. Acad. Sci. USSR, #6, 1956.

35. MALKEVICH, M.S. The theoretical calculation of solar radiation absorbed in the atmosphere during different time intervals. Pap. Inst. Geophys. of Acad. Sci. USSR, #37, 1956.

36. MALKEVICH, M.S. On the solution of integral equations for the scattering of light in the atmosphere. Geophys. J. Acad. Sci. USSR, #9, 1956.

37. MININ, I.N. On the light regime in a turbid medium. Geophys. J. Acad. Sci. USSR, 1956. (in publication).

38. PIASKOVSKAIA-FESENKOVA The computation of scattering of higher order, Reports Acad. Sci. USSR, Vol. 38, #1, 1953.

39. PIASKOVSKAIA-FESENKOVA The brightness of the sky in the case when all magnitudes of scattering are taken into account. Reports Acad. Sci. USSR, Vol. 103, #6, 1955.

40. PIASKOVSKAIA-FESENKOVA On the computation of scattering of higher orders of magnitude. J. Acad. Sci. of Kazakh SSR, Astron. and Physical Series, Vol. 4, #1-2, 1955.

41. ROZENBERG, G.V. The vector-parameter of Stokes. "Advances in physical science", Vol. 56, #1, 1955.

42. SOBOLEV, V.V. A new method in the theory of scattering of light. J. of Astron., Vol. 28, #1, 1951.

43. SOBOLEV, V.V. Theory of the scattering of light in the atmosphere of planets. "Advances in the astronomy", Vol. VI, 1954.

44. SOBOLEV, V.V. The development of absorption lines in the case of incoherent scattering of light. J. of Astron., Vol. 31, #3, 1954.

45. SOBOLEV, V.V. Diffusion of radiation as a redistribution of frequencies. Sci. Pap. State Univ. of Leningrad, #5, 1955.

46. FEIGELSON, E.M., MALKEVICH, M.S. and KOGAN, S.IA. The calculation of brightness of light in the atmosphere in the case of anisotropic scattering. Pap. Inst. of Atmospheric Physics of Acad. Sci. USSR., #2, 1957.

47. FEIGELSON, E.M. and PASTUKHOV, V.A.	A simplified method for the calculation of the asymmetrical distribution of scattering coefficients in the problems of atmospheric optics. Geophys. J. Acad. Sci. USSR, #4, 1956.
48. FEIGELSON, E.M.	On the calculation of the selective absorption in the theory of radiative heat exchange in the atmosphere. Geophys. J. Acad. Sci. USSR, #3, 1956.
49. FESENKOV, V.G.	On the daytime brightness of the clear sky in the case of a spherical form for the earth. Reports Acad. Sci. USSR, Vol. 101, #5, 1955.
50. FESENKOV, V.G.	A contribution to the theory of the brightness of daytime sky in the case of a spherical form for the earth. J. of Astron., Vol. 32, #3, 1955.
51. SHEKHTER, F.N.	The computation of long wave radiation fluxes from a limited solid angle and from the hemisphere. Pap. MGO, #39, 1953.
52. BARASHKOVA, E.P.	The dependence of scattered radiation on the coefficients of turbidity. Pap. MGO, #46 (108), 1955.
53. GAEVSKII, V.L.	The surface temperature of large territories. Pap. MGO, #26 (88), 1951.
54. GOISA, N.I.	The absorption of solar radiation in free atmosphere over the Kiev region. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #3, 1955.
55. ELOVSKIKH, M.P.	The angular distribution of the intensity of longwave radiation of the atmosphere. State Univ. of Leningrad, author's thesis, for a Sci. degree, 1956.
56. ZAVODCHIKOVA, V.G. and KONDRATEV, K.IA.	On the space distribution of scattered and reflected light. Sci. Pap. State Univ. of Leningrad, #2, 1953.
57. KASTROV, V.G.	Variation of the absorption of solar radiation in the free atmosphere. Pap. CFI, #8, 1952.
58. KIRILLOVA, T.B.	A comparative study of different methods for the determination of the effective radiation at the earth's surface. Pap. MGO, #27 (89), 1951.
59. KONDRATEV, K.IA., KUDRIAVTSEVA, L.A. and MANOLOVA, M.P.	The distribution of intensity of energy and the light of scattered radiation over the sky. Sci. Pap. Univ. of Leningrad, #5, 1955.
60. KONDRATEV, K.IA. and MANOLOVA, M.P.	On the influx of scattered radiation at the surface of a slope. Met. & Hydr., #6, 1955.
61. LOGINOVA, Z.A.	On the temperature of the earth's surface. State Univ. of Leningrad, a thesis, 1956.

62.	LOPUKHIN, E.A.	Studies of the radiation field of the lower troposphere over Tashkent on clear days. Pap. Inst. Math.-Mech. Acad. Sci. of Uzbek SSR, #14, 1955.
63.	LVOVA, E.M.	Measurements of the global radiation and the albedo of the earth up to a height of 10-20 km. Pap. CFI, #18, 1956.
64.	MAKHOTKIN, L.G.	On the intensity variations of the non-monochromatic radiation in a limited interval. Pap. MGO, #26 (88), 1951.
65.	NIKITINSKAIA, N.I.	On the application of interference filters for spectral studies of solar radiation. Pap. MGO, #46 (108), 1955.
66.	PIASKOVSKAIA-FESENKOVA, E.V.	On the asymmetry of the distribution of atmospheric coefficients of scattering of light. Reports Acad. Sci. USSR, Vol. 73, #2, 1950.
67.	PIASKOVSKAIA-FESENKOVA, E.V.	Particular sectors of the sky with respect to scattered light. J. of Astron. Vol. 27, #4, 1950.
68.	PIASKOVSKAIA-FESENKOVA, E.V.	On some peculiarities of the scattered light in the earth's atmosphere. J. Acad. Sci. of Kozakh SSR, astron. physical series, #5, 1951.
69.	PIASKOVSKAIA-FESENKOVA, E.V.	The dependence of the scattered light in the atmosphere on wave length. Reports Acad. Sci., USSR, Vol. 80, #4, 1951.
70.	PIASKOVSKAIA-FESENKOVA, E.V.	The infrared spectrum of the halo round the sun. Reports Acad. Sci. USSR, Vol. 85, #5, 1952.
71.	PIASKOVSKAIA-FESENKOVA, E.V.	Some results on atmospheric coefficients of the scattering of light. Reports Acad. Sci. USSR, Vol. 86, #5, 1952.
72.	PIASKOVSKAIA-FESENKOVA, E.V.	Some results on the optical properties of the atmosphere in mountain regions. J. of Astron., Vol. 29, #3, 1952.
73.	FESENKOV, V.G.	On the daytime brightness of the clear sky. Reports Acad. Sci. USSR, Vol. 101, #5, 1955, J. of Astron. #3, 1955.
74.	SIVKOV, S.I.	General laws governing the daily march of solar radiation on a horizontal surface. Pap. MGO, #26 (88), 1951.
75.	CHKHAIDZE, SH. M.	Solar radiation and turbidity of the atmosphere on the Kanobil mountain. Bull. Astro-physical Obs. of Abastumani, #11, 1950.
76.	CHKHAIDZE, SH. M.	A contribution to the determination of the coefficients of transparency in the atmosphere. Geophys. J. Acad. Sci. USSR, #6, 1952.

77. FARAPONOVA, G.P. Some results of actinometric measurements on free balloons. Pap. CAO, #8, 1952.

78. FARAPONOVA, G.P. and KASTROV, V.G. Actinometric measurements on free balloons. Pap CAO, #8, 1952.

79. SHEKHTER, F.N. A contribution to the computation of radiant heat flow in the atmosphere. Pap. MGO, #22 (84), 1950.

80. SHLIAKHOV, B.I. A study of the longwave radiation balance in the troposphere (in publication).

81. IAROSLAVTSEV, I.N. The distribution of the brightness of the sky. Geophys. J. Acad. Sci. USSR, #1, 1953.

82. BOCHAROV, E.I. On some problems related to the transparency of clouds and fogs. The author's thesis for the "candidate" degree, Moscow, 1955.

83. TOROPOVA, T.P. The determination of water vapour content in the atmosphere. J. Acad. Sci. of Kazakh SSR, Astron.-Phys. Series, #1-2, 1955.

84. GAEVSKII, V.L. The measurement of radiation flux in clouds. Pap. MGO, #46 (108) 1955.

85. MININ, I.N. A contribution to the light regime deep inside a cloud layer. Pap. MGO (in publication).

86. TIMOFEEVA, V.A. The complex scattering of light in turbid mediums. Pap. Inst. of Marine Hydrophysics of Acad. Sci. USSR, Vol. III, 1953.

87. FEIGELSON, E.M. Radiation properties of clouds. Geophys. J. Acad. Sci. USSR, #4, 1951.

88. FEIGELSON, E.M. Determination of the water content of clouds by their scattering properties. Pap. Inst. of Geophys. of Acad. Sci. USSR, #23, 1954.

89. FEIGELSON, E.M. Absorption of solar radiation in the atmosphere in the presence of clouds. Pap. Inst. of Geophys. of Acad. Sci. USSR, #23, 1954.

90. FEIGELSON, E.M. The vertical distribution of temperature in a cloudy state of the atmosphere. Pap. Inst. Geophys. of Acad. Sci. USSR, #37, 1956.

91. CHELTSOV, N.I. Investigations of the reflection, transmission and scattering of solar radiation by some forms of cloud. Pap. CAO, #8, 1952.

92. SHIFRIN, K.S. The effect of fog on the radiation balance. Pap. MGO #27, 1951.

93. SHIFRIN, K.S. The scattering of light in a turbid medium, 1951.

94. SHIFRIN, K.S. and BOGDANOVA, N.P. — A contribution to the theory of the effect of fog on the radiation balance. Pap. MGO, #46, 1955.

95. SHIFRIN, K.S. — On the computation of radiation in clouds. Pap. MGO, #46, 1955.

96. SHIFRIN, K.S. — The transfer of blackbody radiation in clouds. Pap. MGO, #46, 1955.

97. AVSIUK, G.A. — The artificial enhancement of ice and snow melt on mountain glaciers. Pap. Inst. of Geog., Vol. 56, 1953.

98. AIZENSHTAT, B.A., KIRILLOVA, T.V., LAIKHTMAN, D.L., OGNEVA, T.A., TIMOFEEV, M.P. and TSEITIN, G.KH. — Changes in the heat balance of the earth's surface in the case of irrigation. Pap. MGO, #39 (101), 1953.

99. ALEKSEEVA, N.A. — The albedo of certain types of earth surface for total and longwave radiation. Pap. CAO, #8, 1952.

100. BAGROV, N.A. — The planetary albedo of the earth. Pap. CFI, #35 (62), 1954.

101. BRASLAVSKII, A.P. and VIKULINA, Z.A. — Rates of evaporation from the surface of lakes. Editor: A.I. CHEBOTAREVA. CA Hydromet. S, MGO, Leningrad, 1954.

102. BUDYKO, M.I., DROZDOV, O.A., LVOVICH, M.I., POGOSIAN, KH.P., SAPOZHNIKOVA, S.A. and IUDIN, M.I. — Changes of climate in relation to the modification of Nature in arid regions of the USSR Hydromet. Publ. House, 1952.

103. DROZDOV, O.A. — The data of an expedition to the Kamen steppe. Pap. MGO, #40 (102), 1953.

104. ZAVODCHIKOVA, V.G. and KONDRATEV, K.IA. — On the space distribution of scattered and reflected radiation. Sci. Pap. Univ. of Leningrad, #2, 1953.

105. KRASILCHSHIKOVA, L.B. and NOVOSELTSEV, E.P. — Spectral reflection from a standard calibration reflector. "Optics and Spectroscopy", 1956 (in publication).

106. KAZACHEVSKII, V.M. — Photometrical determination of the reflecting power of the earth's surface. Thesis of the author, Alma-Ata, 1953.

107. KASTROV, V.G. — Determination of the sensitivity dependence of air pressure of IANISHEUSK'S pyranometers. Pap. CAO, #13, 1954.

108. KASTROV, V.G. — A contribution to the daily variation of the albedo of the earth's surface. CAO, #14, 1955.

109. KIRILLOVA, T.V. The effect of irrigation on the radiation characteristics of the earth's surface. Pap. MGO, #37 (99), 1952.

110. KONDRATEV, K.IA. and TER-MARKARIANTS, M.E. The albedo of seas in the presence of waves. Met. & Hydr., #8, 1953.

111. KONDRATEV, K.IA. and TER-MARKARIANTS, M.E. On the daily variation of albedo. Met. & Hydr., #6, 1953.

112. KONDRATEV, K.IA. Radiation energy of the sun. Hydromet. Publ. House, 1954.

113. KONDRATEV, K.IA. and KUDRIAVTSEVA, L.A. A contribution to the albedo of the sea surface. Met. & Hydr., #3, 1955.

114. KONDRATEV, K.IA. Radiative heat exchange in the atmosphere. Hydromet. Publ. House, 1956.

115. LOPUKHIN, E.A. On the radiation regime of a cotton field. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 14, #3, 1950.

116. LOPUKHIN, E.A. An approximate method for the computation of the distribution of global radiation over a cotton field. Pap. MGO, #5, 1951.

117. LVOVA, E.M. The measurement of global solar radiation and the albedo of the earth's surface up to 10-20 km. Pap. CAO, #18, 1956.

118. SUIAKVELIDZE, G.K. Some radiation properties of dry snow. Reports Acad. Sci. of Gruz SSR, Vol. 12, #8, 1951.

119. FARAPONOVA, G.P. Some results of actinometric measurements by means of free balloons. Pap. CAO, #8, 1952.

120. FEDOSEEVA, A.P. The albedo of the system earth - atmosphere and its distribution over the globe. Pap. MGO, #41, 1953.

121. FORSH, L.F The reflection of solar radiation from the surface of lakes. Laboratory of Lake Control of Acad. Sci. USSR. Vol. III, 1954.

122. SHIFRIN, K.S. A contribution to the theory of albedo. Pap. MGO, #39, 1953.

123. IAROSLAVTSEV, I.N. The albedo of natural surface cover in Tashkent. Geophys. J. Acad. Sci. USSR, #1, 1952.

124. IAROSLAVTSEV, I.N. Shortwave infrared radiation of the sun from 0.8 to 3.5μ (in publication).

125. BARTENEVA, O.D. The visibility of lights in field conditions. Pap. MGO, #42 (104), 1953.

126. BARTENEVA, O.D., BOLDYREV, N.G. and BUTYLEV, A.A. Determination of the transparency of air and the power of distant lights by starlight photometer. Pap. MGO, #42 (104), 1953.

127. BOLDYREV, N.G. — The visibility of real objects. Pap. MGO, #19 (81), 1950.

128. BOLDYREV, N.G. and BARTENEVA, O.D. — Manual for the determination of the visibility of real objects. Hydromet. Publ. House, 1950.

129. BOLDYREV, N.G. — The precision of visibility instruments. J. Acad. Sci. USSR, Technical series, #12, 1951.

130. BOLDYREV, N.G. — Experimental verification of the energetic theory of the perceptility of vision. "Prob. of Psychological optics", Vol. VIII, 1953.

131. BOLDYREV, N.G. — The importance of S.I. VAVLOV'S work on quantum fluctuations. A publication of Acad. Sci. USSR, 1953.

132. BOLDYREV, N.G. and BARTENEVA, O.D. — The determination of meteorological visibility by contrast of distant objects. Pap. MGO, #42 (104), 1953.

133. BUTYLEV, A.A. — The construction of linear navigation beacons. "River Transport", #4 , 1952.

134. BUTYLEV, A.A. — The basis for the national calculation of flashing electric light beacons. Publication of LIOT (? Translator) Leningrad, 1953.

135. BUTYLEV, A.A. — The photometrical measurement of distant lights. "Pap. on Hydrology" #1, 1954.

136. GAVRILOV, V.A. — A new visibility instrument, Pap. MGO, #19, 1950.

137. GAVRILOV, V.A. — On the nephelodometric measurement of the transparency of the atmosphere. Met. & Hydr., #3, 1950.

138. GAVRILOV, V.A. — On some actual problems in the study of visibility. Geophys. J. Acad. Sci. USSR, #6, 1953.

139. GAVRILOV, V.A. — An instrumental method for the determination of the visibility of real objects. Pap. MGO, #42, 1953.

140. GAVRILOV, V.A. — On the diaphanoscopic method of visibility measurement. Met. & Hydr., #6, 1956.

141. GAVRILOV, V.A. — Computational results from the visibility data obtained by a visibility instrument currently employed in the network. Pap. MGO (in publication).

142. LAZAREV, D.N. — A visual method of the estimation of visibility. "Prob. of psychological optics", Vol. 8, 1953.

143. — Methodical instructions of the Chief, Adm. of Hydromet. Serv. #20 (Organization of visual observations on meteorological visibility; critical evaluation of observational data (for one station) and the theoretical basis for determination of the meteorological visibility of real objects in the landscape). Hydromet. Publ. House, 1955.

144. Methodical instructions for hydrometeorological visibility at hydrometeorological stations during daylight. Hydromet. Publ. House, 1955.

145. PINEGIN, N.I., BOLDYREV, N.G. and BARTENEVA, O.D. The calculation of visibility. Reports Acad. Sci. USSR, Vol. 34, #3, 1952.

146. Instructions for organizing observations on meteorological visibility at hydrometeorological stations during daylight. Hydromet. Publ. House, 1956.

147. RODINOV, S.F. The transparency of the atmosphere in the ultra-violet spectral interval. Geophys. J. Acad. Sci. USSR, #4, 1950.

148. BEZVERKHNII, SH.A., OMEROVICH, A.P. and RODINOV, S.F. Electrophotometric studies of atmospheric ozone during the solar eclipse. Reports Acad. Sci. USSR, Vol. 106, #4, 1956.

149. BEZVERKHNII, SH.A. The variation of ozone at Alma-Ata on clear days. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #7, 1956.

150. BEZVERKHNII, SH.A. Ozonometric data for Alma-Ata. Pap. Hydromet. Sci.-Res. Inst. of Kazakhstan, #5, 1955.

151. RODINOV, S.F., BEZVERKHNII, SH.A. and OMEROVITS, A.P. Electro-photometric studies of transparency of the atmosphere in the ultra-violet spectral interval. Geophys. J. Acad. Sci. USSR, #3, 1952.

152. PROKOFEVA, I.A. Atmospheric ozone. Publ. Acad. Sci. USSR, Moscow-Leningrad, 1951.

V PHYSICS OF CLOUDS AND PRECIPITATION

During the period 1950-1956 studies in cloud and precipitation physics were pursued in the USSR along the following lines:

To devise instruments and methods for investigation of the structure of clouds and precipitation, as well as of the size, structure and chemical constitution of cloud and precipitation elements, the water content of clouds, intensity of precipitation, etc., etc. by special flights in clouds, by stationary constant level balloons and at mountain stations a large volume of observational data has been collected. A great amount of laboratory work has been devoted to the study of the processes of evaporation, condensation and coagulation of droplets and of the effect of the solid phase on these processes, etc. A number of laws governing the distribution of the size of cloud and precipitation elements, their coagulation and transformation, as well as the mechanism for the development of different forms of precipitation have been brought to light. The results of these studies are reported in papers (1-48).

The characteristic distribution of certain meteorological elements in clouds have been investigated. The instruments and methods for studying convective motion in the free atmosphere, in particular in convective clouds, have been determined. Some laws governing the mechanism of the development of airmass clouds of stratus and cumuli form over plains and mountains have been discussed in (49-70).

The airmass and frontal cloud systems and their variation with synoptic situations, the space structure of frontal cloud systems and the relation of their development to large scale atmospheric processes; some relationships between the microstructure of clouds and the conditions for cloud development and decay, characteristic values for the height of base and depth of different types of clouds and cloud systems and their association with physical-geographical regions are all investigated in (71 - 78).

LITERATURE

1. BOROVIKOV, A.M. and KHRGIAN, A.KH. The flight of Oct. 27, 1948, for the investigation of processes taking place in water droplet clouds. Pap. CAO, #5, 1950.

2. BOROVIKOV, A.M. and KHRGIAN, A.KH. On the study of clouds by optical methods. Pap. CAO, #5, 1950.

3. BOROVIKOV, A.M. Some results of an investigation on the structure of ice crystal clouds. Pap. CAO, #10, 1953, Pap. MGO, #24, 1950.

4. ZAITSEV, V.A. The water content and distribution of droplet sizes in cumulus clouds. Pap. MGO, #19, 1950, Geophys. J. Acad. Sci. USSR, #6, 1955.

5. ZAMORSKII, A.D. The growths of snowflakes by coagulation. Pap. MGO, #24, 1950.

6. KRASIKOV, P.N. and NIKANDROV, V.IA. On sublimation nuclei in the atmosphere. Pap. MGO, #47, 1954.

7. KRASIKOV, P.N. and CHIKIROVA, G.A. Microphysical characteristics of local fogs. Pap. MGO, #57, 1956.

8. KRASNOGORSKAIA, N.V. A photometrical method for the study of the distribution of cloud particles. Geophys. J. Acad. Sci. USSR, #6, 1955.

9. LEVIN, L.M. On the deposition of aerosol particles on obstacles to flow. Rep. Acad. Sci. Vol. 91, #6, 1953.

10. LEVIN, L.M. and STAROSTINA, R.F. Some results of an investigation on the structure of clouds. Reports Acad. Sci. USSR, Vol. 93, #2, 1953.

11. LEVIN, L.M. On the coagulation of charged cloud particles. Reports Acad. Sci. USSR, Vol. 94, #3, 1954.

12. LEVIN, L.M. On the function expressing the distribution of droplet sizes in clouds and rain. Reports Acad. Sci. USSR, Vol. 94, #6, 1954.

13. LITVINOV, I.V. On the spectrum of rain droplet sizes. Geophys. J. Acad. Sci. USSR, #1, 1956.

14. LITVINOV, I.V. The effect of the formation of solid particles on the spectrum of rain droplet radii. Geophys. J. Acad. Sci. USSR, #2, 1956.

15. LITVINOV, I.V. On the speed of falling snow flakes. Geophys. J. Acad. Sci. USSR, #3, 1956.

16. LITVINOV, I.V. A conveyor recorder for the intensity of rain. Geophys. J. Acad. Sci. USSR, #4, 1955.

17. MUCHNIK, V.M.	A contribution to the problem of development of large droplets in showers. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #4, 1955.
18. MUCHNIK, V.M. and SHMUKLER, A.KH.	On the melting of falling hail. Pap. Hydromet. Sci.-Res. Inst. of Ukraine, #1, 1954.
19. NIKANDROV, V.IA.	A contribution to the electric charges on cloud and fog droplets. Pap. MGO, #57, 1956.
20. NIKANDROV, V.IA.	A contribution to the problem of development of solid cloud elements by sublimation. Pap. MGO, #31, 1951.
21. NIKANDROV, V.IA.	On the interaction of supercooled water droplets and solid particles. Pap. MGO, #57, 1956.
22. NIKANDROV, V.IA.	On the process of combination of water vapour molecules in the atmosphere. Pap. MGO, #31, 1951.
23. NIKANDROV, V.IA.	Experiments with supercooled water droplets. Pap. MGO, #31, 1951.
24. TVERSKAIA, N.P.	A contribution to the problem of determining the coefficient of effectiveness of mutual collision of water droplets. Pap. MGO, #47, 1954.
25. KHIMACH, M.A.	An experimental study of the melting of spherical ice particles. Pap. MGO, #47, 1954.
26. KHIMACH, M.A. and SHISHKIN, N.S.	Determination of the coefficient of mutual collision of water droplets. MGO, #31, 1951.
27. KHRGIAN, A.KH.	Some results on the microstructure of clouds. Pap. CAO, #7, 1952.
28. KHRGIAN, A.KH. and MAZIN, I.P.	On the distribution of droplet sizes in clouds. Pap. CAO, #7, 1952.
29. KHRGIAN, A.KH. and MAZIN, I.P.	An analysis of methods used for the characterization of the distribution of cloud droplets. Pap. CAO, #17, 1956.
30. KHRGIAN, A.KH. and MAZIN, I.P.	Calculation of the errors of aircraft sampling of droplets. Pap. CAO, #12, 1953.
31. SHVETS, M.E.	A contribution to the study of the deposition of cloud droplets on solid bodies. Pap. MGO, #24, 1950.
32. SHIFRIN, K.S.	The kinetics of the process of precipitation. Pap. MGO, #31, 1951.
33. SHIFRIN, K.S.	On the increase of average droplet size with height. Pap. MGO, #31, 1951.
34. SHIFRIN, K.S.	On the evaporation of precipitation during the descent. Pap. MGO, #31, 1951.

35. SHISHKIN, N.S. The effect of the distribution of cloud droplet sizes on the size of rain drops. Pap. MGO, #54, 1955.

36. SHISHKIN, N.S. The result of some measurements of the size of droplets. Pap. MGO, #47, 1954.

37. SHISHKIN, N.S. An investigation of development processes in summer precipitation and thunderstorm electricity. UFN, Vol. 45, #3, 1953.

38. SHISHKIN, N.S. An investigation of the growth of spherical hail. Geophys. J. Acad. Sci. USSR, #6, 1952.

39. SHISHKIN, N.S. Some physical laws governing the phase transformations of hydrometeors. Geophys. J. Acad. Sci. USSR, #1, 1953.

40. SHISHKIN, N.S. On the moisture in cumulus clouds. Pap. MGO, #31, 1951.

41. SHISHKIN, N.S. On the moisture and liquid water content in cumulus clouds. Met. & Hydr., #7, 1951.

42. SHISHKIN, N.S. On the dimensions of rain drops. Reports Acad. Sci. USSR, Vol. 90, #2, 1953.

43. SHISHKIN, N.S. On the coalescence of cloud droplets. Pap. MGO. #24, 1950.

44. SHISHKIN, N.S. On the intensity of rain from clouds having uniform vertical ascent of air. Pap. MGO, #31, 1951.

45. SHISHKIN, N.S. Clouds, precipitation and thunderstorm electricity. GITTL, 1951.

46. SHISHKIN, N.S. Precipitation from convective clouds. Pap. MGO, #24, 1950.

47. SHISHKIN, N.S. An approximate solution of the problem of the growth of droplets by condensation in the case when curvature of droplets surfaces and concentration of the mixture is taken into account. Pap. MGO, #31, 1951.

48. SHMETER, S.M. On the chlorine content of cloud drops in relation to the microstructure of a cloud. Pap. CAO, #9, 1952.

49. BUDILOVA, E.P. and SHISHKIN, N.S. Calculation of the amount of condensed water vapour in convective clouds. Pap. MGO, #47, 1954.

50. VULFSON, N.I. On research methods of the convective motions in the free atmosphere. Reports Acad. Sci. USSR, Vol. 91, #2, 1953.

51. VULFSON, N.I. Convective motions in cumulus clouds. Reports Acad. Sci. USSR, Vol. 97, #1, 1954.

52. VULFSON, N.I.	A method for investigation of convective motions in the free atmosphere. Geophys. J. Acad. Sci. USSR, #5, 1956.
53. VULFSON, N.I.	The conditions for the development of cumulus clouds over a mountainous locality. Geophys. J. Acad. Sci. USSR, #7, 1956.
54. KACHURIN, L.G.	The development of precipitation in clouds with weak vertical motion. Geophys. J. Acad. Sci. USSR, #2, 1956.
55. MASLOVA, S.P.	A contribution to the problem of estimating the physical maximum of precipitation. Pap. MGO, #37, 1952.
56. NIKANDROVA, G.T. and CHUVAEV, A.P.	On the role of inversion layers in the discharge of precipitation. Met. & Hydr., #4, 1956.
57. SELEZNEVA, E.S.	On the accuracy of measuring the amount of moisture by meteographs attached to aircraft. Met. & Hydr., #1, 1950.
58. SELEZNEVA, E.S.	On factors determining the amount of cumulus clouds. Met. & Hydr., #2, 1953.
59. SKATSKII, V.I.	An electromechanical accelograph with a piezoquartz transmitting element. Geophys. J. Acad. Sci. USSR, #5, 1956.
60. KHIMACH, M.A. and SHISHKIN, N.S.	Precipitation from water clouds in the region of Leningrad. MGO, #47, 1954.
61. CHESTNAIA, N.I.	The variation of temperature and humidity measured while flying from cumulus clouds into the surrounding air. Pap. MGO, #24, 1950.
62. CHUVAEV, A.P. and KRIUKOVA, G.T.	Some results of studies on the vertical extent of cumulus clouds. Pap. MGO, #47, 1954.
63. CHURINOVA, M.P.	Some characteristics of the turbulence on days with stratus cloud cover. Pap. MGO, #54, 1955.
64. CHURINOVA, M.P.	On turbulence during days having cumulus clouds. Pap. MGO, #24, 1950.
65. SHCHELOKOV, V.V.	An airplane thermometer. Geophys. J. Acad. Sci. USSR, #5, 1956.
66. SHISHKIN, N.S.	Application of the slice method for forecasting the vertical extent of convective clouds. Pap. MGO, #54, 1955.
67. SHISHKIN, N.S.	A contribution to the theory of summer precipitation. Met. & Hydr., #7, 1952.

68. SHISHKIN, N.S. On the methods of studying vertical development in convective clouds. Pap. MGO, #47, 1954.

69. SHISHKIN, N.S. On the development conditions of convection currents in the atmosphere. Pap. MGO, #47, 1954.

70. SHISHKIN, N.S. The role of the freezing of cloud droplets in the development of summer precipitation. Pap. MGO, #47, 1954.

71. BUGAEV, V.A. On the problem of the transformation of cumulus into high cloud types. Met. & Hydr., #1, 1951.

72. DZHURAEV, A.A. An aerosynoptical study of the transformation of unstable Ac clouds into Ac virga. In the book "Meteorology and Hydrology in the Uzbekistan", 1955.

73. ZAK, E.G. and MARFENKO, O.V. The structure of the lowest layer of cloud cover. Pap. CAO, #7, 1952.

74. ZAK, E.G. and BOROVIKOV, A.M. A contribution to the development of the space structure and phase condition of frontal clouds. Pap. CAO, #7, 1952.

75. ZAK, E.G. and BOROVIKOV, A.M. Experimental studies of warm front cloud systems. Pap. CAO, #15, 1956.

76. MAZURIN, N.I. and NOVIKOV, B.M. Some properties of cold frontal cloud systems. Pap. VGMF SA, #11, 1955.

77. MATVEEV, L.T. Vertical motion in the boundary layer of the atmosphere and its connection with the height of the base and top of clouds. Pap. VGMF SA, #11, 1955.

78. RESHCHIKOVA, A.A. and TOPKOVA, Z.V. On the relationship between the base of clouds and the visibility. Pap. CAO, #7, 1952.

VI PHYSICS OF THE GROUND LAYER OF THE ATMOSPHERE AND TURBULENCE

Investigations in the physics of the ground layer of the atmosphere are closely related to studies of atmospheric turbulence. A great number of studies in the field of atmospheric turbulence are based on the so-called local isotropic theory of turbulence, published by A. N. KOLMOGOROV and A. M. OBUKHOV in 1941. A critical discussion and a further development of that theory may be found in (46). The structure of the temperature field in a turbulent flow is theoretically treated in works (47, 69). The theoretical results obtained in respect of the structure of temperature and wind velocity fields were verified experimentally by means of special instruments and were in good agreement with experimental data (32, 48, 49). The basic ideas of the local isotropic theory of turbulence have found application in studies of the large scale structure of meteorological fields (66) and in the construction of instruments for the measurement of wind speed (70).

In practical computations and analyses of processes taking place in the boundary layer, wide use has been made of concepts from the semi-empirical theory of turbulence. Proceeding from this theory, equations have been suggested for calculation of the coefficient of turbulent exchange from the vertical distribution of the temperature and windspeed in the ground layer for different stratifications (8, 9, 34). In more recent works (41, 26) the analogy method has been applied for the study of the role of stratification in turbulent exchange. Papers (1, 14, 27, 33) deal with methods of the direct determination of heat and mass flow in the atmosphere from the direct measurement of the microfluctuation of meteorological elements.

Great attention has been directed to the experimental and theoretical studies of the vertical distribution and time variation of basic meteorological elements. Experimental data on the vertical profiles of wind, temperature and moisture, obtained at stationary stations (51) and on some expeditions (14, 15, 27, 40, 52) have been analyzed from the viewpoint of turbulence theory suggested in (8, 9, 34, 41).

Paper (3) deals with contemporary views on the relationship between the coefficient of exchange and the height, turbulent energy balance and the vertical wind profile up to gradient wind level. The theory of periodic and non-periodic measurements of temperature and moisture in the lower layers of the atmosphere and the top layer of soil (4, 19, 35, 67) as well as of the measurements of wind with time, has been worked out (5, 74). Proceeding from these studies, forecast methods for daily variation of temperature and humidity (4, 19, 34, 35, 67), for the night minimum temperature (20, 65, 71), for intensity of dew(4) and for night fogs (including its characteristics) (4, 25) have been developed. The temperature and moisture variations over water surfaces have been studied and forecast methods for "Arctic Sea Fog" suggested (17, 59-61).

A considerable number of papers (4, 18, 21-24, 36, 37, 64) have been devoted to the study of airmass modifications by surface influences. In these papers, stationary and place to place variations of temperature and moisture are studied. The equations obtained are utilized for forecasting temperature and moisture.

On basis of results obtained regarding time variations of the meteorological elements and the modification of air masses, a theory of some practical methods of controlling the meteorological regime in the ground layer has been worked out. To this section belong also the papers directed to study of the meteorological effectiveness of combat methods for night frosts by smoke screen and open fires (4, 6, 7), by irrigation (4, 11, 12, 38, 62, 72) and by field protecting forestbelts (13, 16, 53, 57).

One of the most important application of the theory of turbulence is that for explanation of the distribution of foreign particles in the atmosphere. For the solution of this problem the equations obtained in the airmass modification studies (4, 36, 42) are applied for the spreading of impurities from the source. The diffusion theory is improved (14) for heavy particles. The limiting rates of spreading of particles is studied in (39, 43). Papers (44, 45) on the theory of diffusion are based on the known relationship between the coefficient of exchange and the scale of turbulence.

Papers (28, 50, 54-56) are devoted to the theoretical study of the effect of turbulence on the propagation of sound and electromagnetic waves in the atmosphere.

Diffraction effects are also studied in these works and the results obtained are in good agreement with corresponding experimental measurements (29 - 31, 68).

LITERATURE

1. AIZENSHTAT, B.A.	On the direct determination of a component of the heat balance of the earth's surface. J. of Information, #1, 1951.
2. BERLIAND, M.E.	Daily variation of the temperature due to turbulent exchange and radiation balance. Pap. MGO, #48 (110), 1954.
3. BERLIAND, M.E.	Theory of the change of wind with height. Pap. Re. Dep. of Chief Admin. of Hydromet. Serv. #25, 1947.
4. BERLIAND, M.E.	Forecasting and control of the heat regime of the surface layer of the atmosphere. Hydromet. Publ. House, 1956.
5. BERLIAND, M.E.	A contribution to the theory of the variation of wind in the surface layers of the atmosphere. MGO, #23 (85), 1950.
6. BERLIAND, M.E. and KRASIKOV, P.N.	Forecasting and combatting night frost. Hydromet. Publ. House, 1953.
7. BERLIAND, M.E., GOLTSBERG, I.A., DAVITIA, F.F. and KRASIKOV, P.N.	On combatting night frost in the USSR, Met. & Hydr., #2, 1952.
8. BUDYKO, M.I.	Evaporation under natural conditions. Hydromet. Publ. House, 1949.
9. BUDYKO, M.I., LAIKTMAN, D.L. and TIMOFEEV, M.P.	The determination of the coefficient of turbulent exchange. Met. & Hydr., #3, 1953.
10. BUDYKO, M.I. and IUDIN, M.I.	Heat exchange between the earth's surface and the atmosphere and the equilibrium gradient of temperature. Met. & Hydr., #1, 1948.
11. BUDYKO, M.I., DROZDOV, O.A., LVOVITS, M.I., POGOSIAN, KH.P., SAPOZHNIKOVA, S.A. and IUDIN, M.I.	Variations of climate in connection with the plan for the modification of Nature. Hydromet. Publ. House, 1952.
12. BUDYKO, M.I., IUDIN, M.I., and IAKOVLEVA, N.I.	The evaporation from irrigated areas and the potential evaporation. Met. & Hydr., #1, 1954.
13. IUDIN, M.I.,	The effect of field protecting forest belts on turbulent exchange. "The problem of hydrometeorological effect of field protecting forest belts". Hydromet. Publ. House, 1950.

14. Problems in atmospheric turbulence. Editors: E.S. LIAPIN and M.I. IUDIN. Pap. MGO, #16 (78) 1949.

15. Problems in agricultural and forest climatology. Data on an expedition to the Kamen Steppe. Editor: O.A. DROZDOV. Pap. MGO, #40 (102) Hydromet. Publ. House, 1953.

16. Problems of the hydrometeorological effectiveness of planting field protecting forest belts. Hydromet. Publ. House, 1950.

17. GANDIN, L.S. On peculiarities of the evaporation near the coast line, MGO, #55 (117), 1955.

18. GANDIN, L.S. A contribution to the transformation of wind profiles. Pap. MGO, #33 (95), 1952.

19. GUTMAN, L.N. On computation of the temperature of the surface layer of air. Geophys. J. Acad. Sci. USSR, #5, 1953.

20. DOBRYSHMAN, E.M. and BELOUSOV, S.L. On the two layer problem of heat conduction, air-soil. Reports Acad. Sci. USSR, Vol. 93, #6, 1953.

21. DOBRYSHMAN, E.M. On the variation of air temperature under the influence of the ground. Pap. CFI, #21 (48), 1950.

22. DUBENTSOV, V.R. The summer modification of air masses over continents. Pap. CFI, #17, 1949.

23. ZAVARINA, M.V. Aerosynoptical analysis of modification of cold air masses by heat. Pap. MGO., #41, (103), 1953.

24. ZAVARINA, M.V. Changes in the heat and moisture of an air mass moving over a uniform ground surface. Pap. MGO, #48 (110), 1954.

25. ZVEREV, A.S. Fogs and forecasting them. Hydromet. Publ. House, 1954.

26. KAZANSKII, A.B. and MONIN, A.S. Turbulence in the surface inversions. Geophys. J. Acad. Sci. USSR, #1, 1956.

27. A compound expedition of the Hydromet. Service to the PAKHTAARAL in summer of 1952. Editor: D.L. LAIKHINAN, Pap. MGO, #39 (101), 1953.

28. KRASILNIKOV, V.A. The effect of the refraction coefficient of the atmosphere on the propagation of ultra short radio waves. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 13, #1, 1949.

29. KRASILNIKOV, V.A. and IVANOV-SHITS, K.M. Some new experiments on the propagation of sound in the atmosphere. Reports Acad. Sci. USSR, Vol. 67, #4, 1949.

30. KRASILNIKOV, V.A. On phase fluctuations of short waves during their propagation in the surface layer. Reports Acad. Sci. USSR, Vol. 88, #4, 1953.

31. KRASILNIKOV, V.A. and TATARSKII, V.I. On the relation between mean square fluctuations of phase and amplitude and the dimensions of the lens observing star twinkling. Reports Acad. Sci. USSR, Vol. 88, #3, 1953.

32. KRECHMER, S.I. Methods of measurement of microfluctuation of wind speed and temperature in the atmosphere. Pap. Inst. of Geophys. Acad. Sci. USSR, #24 (151), 1954.

33. KUCHEROV, N.V. A method for the direct measurement of turbulent exchange. Pap. MGO, #37 (99) 1952.

34. LAIKHTMAN, D.L. and CHUDNOVSKII, A.F. Physics of the surface layer of the atmosphere. Hydromet. Publ. House, 1949.

35. LAIKHTMAN, D.L. Computation in advance of daily temperature variations in the surface layer of the atmosphere. Pap. MGO, #22 (84) 1950.

36. LAIKHTMAN, D.L. The modification of an airmass under the effects of the earth's surface. Met. & Hydr., #1, 1947.

37. LAIKHTMAN, D.L. and IUDIN, M.I. The modification of the lower layer of air under the effects of the earth's surface. Reports Acad. Sci. USSR, Vol. 93, #2, 1953.

38. LAIKHTMAN, D.L. The physical principles of standardization of rates of irrigation. Geophys. J. Acad. Sci. USSR, #6, 1955.

39. LIAPIN, E.S. On the hyperbolic equation for vertical turbulent exchange in the atmosphere. Pap. MGO, #19 (81), 1950.

40. Microclimatological and climatological studies of the Pre-Caspian plain. A Publ. of Acad. Sci. USSR, 1953.

41. MONIN, A.S. and OBUKHOV, A.M. The basic laws governing turbulent mixing in the surface layer of the atmosphere. Pap. Inst. Geophys. Acad. Sci. USSR, #24 (151), 1954.

42. MONIN, A.S. The semiempirical theory of turbulent diffusion. Pap. Inst. Geophys. Acad. Sci. USSR, #33 (160), 1956.

43. MONIN, A.S. On diffusion at a finite rate. Geophys. J. Acad. Sci. USSR, #3, 1955.

44. MONIN, A.S. Horizontal mixing in the atmosphere. Geophys. J. Acad. Sci. USSR, #3, 1956.

45. MONIN, A.S. The equations for turbulent diffusion. Reports Acad. Sci. USSR, Vol. 105, #2, 1955.

46. OBUKHOV, A.M. and IAGLOM, A.M. The microstructure of turbulent exchange. "Applied math. and mech.", Vol. 15, #1, 1951.

47. OBUKHOV, A.M. Structure of the temperature field in turbulent flow. Geog. and Geophys. J. Acad. Sci. USSR, Vol. 13, #1, 1949.

48. OBUKHOV, A.M. The characteristics of microstructure of wind in the surface layer of the atmosphere. Geophys. J. Acad. Sci. USSR, #3, 1951.

49. OBUKHOV, A.M., PINUS, N.Z. and KRECHMER, S.I. The results of experimental studies of microturbulence in the free atmosphere. Pap. CAO, #6, 1952.

50. OBUKHOV, A.M. On the effect of weak discontinuities in the atmosphere on the propagation of sound and light. Geophys. J. Acad. Sci. USSR, #2, 1953.

51. OGNEVA, T.A. Some properties of the heat balance of the earth's surface. Hydromet. Publ. House, 1955.

52. SAPOZHNIKOVA, S.A. Microclimate and local climate. Hydromet. Publ. House, Leningrad, 1950.

53. SMALKO, IA., A. A contribution to the variation of the absolute humidity of air in the forest and in fields protected by a network of forest belts. Geog. J. Acad. Sci. USSR, #3, 1952.

54. TATARSKII, V.I. A contribution to the theory of sound propagation in a turbulent medium. SHETF, Vol. 25, #1 (7), 1953.

55. TATARSKII, V.I. On the phase fluctuations of sound in a turbulent medium. Geophys. J. Acad. Sci. USSR, #3, 1953.

56. TATARSKII, V.I. On the fluctuations of amplitude and phase of a wave propagated in a slightly anisotropic atmosphere. Reports Acad. Sci. USSR, Vol. 107, #2, 1956.

57. TIMOFEEV, M.P. On methods for the determination of the components of heat balance at the earth's surface. Pap. MGO. #27, 1951.

58. TIMOFEEV, M.P. On the daily variation of turbulent exchange. Pap. MGO, #22 (84), 1950.

59. TIMOFEEV, M.P. A contribution to the theory of advection fogs. Geophys. J. Acad. Sci. USSR, #6, 1955.

60. TIMOFEEV, M.P. Evaporation from water surfaces in a turbulent atmosphere. Sci. Pap. State Univ. of Leningrad, Geog. & Geophys. Series, 1949.

61. TIMOFEEV, M.P. and LAIKHTMAN, D.L. On methods for computing the evaporation from the surface of limited water bodies. Met. & Hydr., #4, 1956.

62. TIMOFEEV, M.P. — On changes in the meteorological regime during irrigation. Geophys. J. Acad. Sci. USSR, #2, 1954.

63. CHERNOV, L.A. — The correlation between the fluctuations of amplitude and phase of a wave propagating in a statistically inhomogeneous medium. "J. of Acoustics," Vol. 1, #1, 1955.

64. SHVETS, M.E. — On the solution of a problem having a parabolic type of equation. "Applied Math. and Mech.", Vol. 18, #2, 1954.

65. SHEKHTER, F.N. and TSEITIN, G.KH. — An improved method for computing in advance the night minimum temperature. Pap. MGO, #53 (115) 1955.

66. IUDIN, M.I. — Some problems of the theory of meteorological fields. Pap. MGO, 19 (81), 1950.

67. IUDIN, M.I. — The relationship between the daily variation of temperature and the convective heat exchange. Geog. J. Acad. Sci. USSR, #4, 1948.

68. IUDALEVICH, F.F. — Some problems connected with the interpretation of the twinkling of stars. Reports Acad. Sci. USSR, Vol. 106, #3, 1956.

69. IAGLOM, A.M. — On the local structure of the temperature field in a turbulent flow. Reports Acad. Sci. USSR, Vol. 69, #6, 1949.

70. IAGLOM, A.M. — On the inertia effect of meteorological instruments used for measurements in a turbulent atmosphere. Pap. Inst. Geophys. Acad. Sci. USSR, #24 (151), 1954.

71. IAKOVLEVA, N.I. — An analysis of night time cooling and forecasting of night frosts. Met. & Hydr., #3, 1954.

72. IAKOVLEVA, N.I. — The modification of air over water bodies. Pap. MGO, #41 (103), 1953.

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